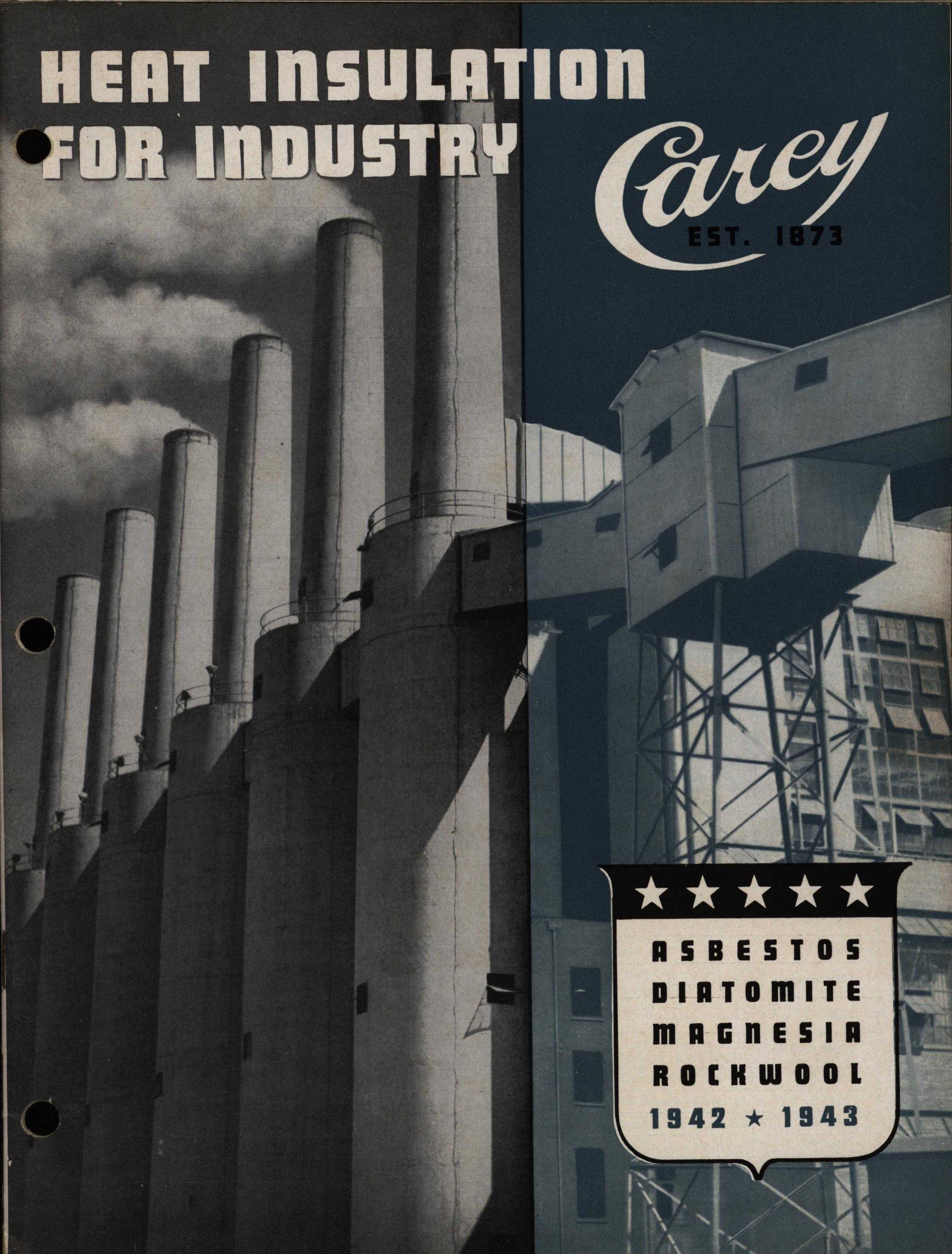
HEAT INSULATION FOR INDUSTRY

Carey
EST. 1873



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ASBESTOS
DIATOMITE
MAGNESIA
ROCKWOOL
1942 ★ 1943

INDUSTRIAL INSULATIONS • GENERAL SELECTION GUIDE

SURFACE AND USES	PRODUCT	PAGE
High Temperature Equipment—(1000° F. to 2500° F.)		
For furnaces, ovens, kilns, lehrs, breechings, etc. Temperatures to 2500° F. or over. Block or brick form.	Carey Hi-Temp No. 19	4
For insulating concrete. Temperatures to 2200° F. A calcined diatomaceous earth.	Carey Calcined Aggregate	5
For manufacture of heat insulating brick, blocks and cements and as filler in hollow insulating walls. A diatomaceous earth in two grades, fine and coarse. Temreratures to 1600° F.	Carey Dicalite Insulating Powder	5
Superheated Surfaces—(500° F. to 1500° F.)		
For superheated steam and hot oil lines, oil stills, ovens, boiler breechings, etc. Usually used in combination with 85% Magnesia. Temperatures to 1000° F. Pipe covering, curved or flat block form.	Carey Hi-Temp No. 15	6
For steel stack lining and breechings. Temperatures to 800° F. Vitrified, light in weight and moisture resistant. Flat and curved sheets.	Carey Vitricel	12
For ovens, ducts, flues, tanks, etc., requiring large flexible sheets. Temperatures to 1300° F.	Carey Rock Wool Blankets	7
Medium and High Pressure Steam Surfaces—(200° F. to 500° F.)		
For pipes and other steam surfaces. Temperatures to 550° F. Pipe covering, flat or curved blocks.	Carey 85% Magnesia	8
For pipes and other steam surfaces. Temperatures to 550° F. Built to withstand hard service. Pipe covering, flat or curved blocks.	Carey Multi-Ply or Asbestos Sponge	8
Low and Medium Pressure Steam Surfaces—(100° F. to 300° F.)		
For pipes, boilers, ovens, etc. Temperatures to 300° F. Unusually low conductivity, resilient, negligible shrinkage. Pipe covering and blocks.	Careycel	8
For pipes, etc. Temperatures to 300° F. Pipe covering, sheets and blocks.	Carey Air Cell	8
For pipes, etc. Temperatures to 300° F. Pipe covering, sheets and blocks.	Carey Excel	8
Cold Water Pipes		
For ice water and cold water pipes to keep water cold and prevent sweating. Pipe covering sections.	Carey Impervo	9
For hot or cold water pipes to prevent sweating or freezing. Inexpensive. Pipe covering sections.	Carey Perfecto	9
For exposed pipes to prevent freezing. Pipe covering sections.	Carey Protecto	9
Air Conditioning Ducts and Equipment		
Careyduct all asbestos ducts, and insulation for metal duct work, and air conditioning equipment.	Careyduct—Careycel—Firefoil	9

SHEET AND PANEL INSULATIONS • SELECTION GUIDE

TEMPERATURES UP TO	CONSTRUCTION	DIMENSION LIMITS			PRODUCT	PAGE
		Width	Length	Thick		
1300° F.	Felted mineral fibre—flexible	24″	96″	1″–6″	Rock Wool Blankets	7
1200° F.	6 plies corrugated asbestos per 1″. (All surfaces vitrified. Each side reinforced.)	36″	108″	1″–4″	Panel Board	12
800° F.	4 plies corrugated asbestos per 1″, vitrified.	Flat—36″ Curved—24″	48″ 36″	1½″–3″	Vitricel	12
700° F.	Portland cement and asbestos, compressed structural sheets flat and corrugated	42″	10″	¼″–5⁄16″	Careystone	12
500° F.	Many layers asbestos felt	36″	108″	½″–4″	Multi-Ply (semi-flex)	8
350° F.	Many layers asbestos felt	36″	108″	½″–4″	Careycel	8
350° F.	6 plies corrugated asbestos per 1″	36″	108″	½″–4″	Excel	8
300° F.	4 plies corrugated asbestos per 1″	36″	108″	½″–4″	Air Cell	8
Cold lines	Felted hair	36″	100″	¼″–3″	Hair Felt	

HEAT INSULATION • CONDENSED SPECIFICATIONS

• SUPERHEAT PIPING INSULATION—Thickness tables for Various Temperature Ranges

Temperature Range	Carey Recommendation	Pipe Sizes and Recommended Insulation Thicknesses								
		½″ to 1½″	2″	2½″	3″	3½″	4″	4½″	5″ to 10″	12″ & larger
1100° F. to 1200° F.	Inner Layer Hi-Temp No. 15 Outer Layer 85% Magnesia	2″ None	2 1/16″ 1½″	1 13/16″ 1½″	2 9/16″ 1½″	1 13/16″ 1½″	2½″ 1½″	2 9/16″ 1½″	3″ 2″	3½″ 1½″
1000° F. to 1100° F.	Inner Layer Hi-Temp No. 15 Outer Layer 85% Magnesia	2″ None	2 1/16″ 1½″	1 13/16″ 1½″	2 1/16″ 1½″	1 13/16″ 1½″	2 1/16″ 2″	2¼″ 2″	3″ 2″	3″ 2″
900° F. to 1000° F.	Inner Layer Hi-Temp No. 15 Outer Layer 85% Magnesia	2″ None	1¼″ 1½″	1 13/16″ 1½″	1 9/16″ 1½″	1 13/16″ 1½″	2 1/16″ 1½″	1 13/16″ 1½″	2½″ 2″	2½″ 2″
800° F. to 900° F.	Inner Layer Hi-Temp No. 15 Outer Layer 85% Magnesia	2″ None	1¼″ 1½″	1 5/16″ 1½″	1 9/16″ 1½″	1 13/16″ 1½″	1 9/16″ 1½″	1 13/16″ 1½″	2″ 2″	2′ 2′
700° F. to 800° F.	Inner Layer Hi-Temp No. 15 Outer Layer 85% Magnesia	2″ None	1¼″ 1½″	1 5/16″ 1½″	1 9/16″ 1½″	1 5/16″ 1½″	1 9/16″ 1½″	1 5/16″ 1½″	1½″ 2″	1½′ 2½″
550° F. to 700° F.	Inner Layer Hi-Temp No. 15 Outer Layer 85% Magnesia	2″ None	1¼″ 1½″	1 5/16″ 1½″	1 9/16″ 1½″	1 5/16″ 1½″	1 9/16″ 1½″	1 5/16″ 1½″	1½″ 1½″	1½″ 2″

• STEAM, HOT WATER AND LOW PRESSURE PIPING INSULATION

		½″ to 3½″ inc.	4″ to 10″ inc.	12″ and larger
450° F. to 550° F.	Carey 85% Magnesia Carey Multi-Ply Carey Asbestos-Sponge	2″ 2″ 2″	Double Std. Thick 2½″ 2½″	3″ 3″ 3″
350° F. to 450° F. (120-415 lb. pres.)	Carey 85% Magnesia Carey Multi-Ply Carey Asbestos-Sponge	1½″ 1½″ 1½″	Double Std. Thick 2″ 2″	3″ 2½″ 2½″
250° F. to 350° F. (30-120 lb. pres.)	Carey 85% Magnesia Carey Multi-Ply Carey Asbestos-Sponge	Std. Thick 1″ 1″	1½″ 1½″ 1½″	2″ 2″ 2″
150° F. to 250° F.	Carey 85% Magnesia Carey Careycel	Std. Thick 1″	Std. Thick 1″	1½″ 1½″

• COLD WATER AND MISCELLANEOUS PIPING INSULATION

Cold Water Piping (60° F. and over)	All pipe sizes—Perfecto (Wool Felt) Covering 1″ thick To prevent freezing—Double 1″ thick Protecto Covering
Ice Water Piping (40° F. to 55° F.)	50° F. and above—Double ½″ thick Impervo Under 50° F.—Double ¾″ thick Impervo
Roof Leaders, Down-Spouts, Soil and Waste Piping	All pipe sizes—Perfecto (Wool Felt) Covering 1″ thick
Brine Piping	From 15° F. to 32° F., Brine thickness Cork or 2 layers, 1″ thick Hair Felt alternated with waterproof paper. From 0° F. to 15° F. Brine thickness Cork or 3 layers, 1″ thick Hair Felt alternated with waterproof paper. From —30° F. to 0° F., special thickness Brine Cork or 4 layers of 1″ thick Hair Felt alternated with waterproof paper.

APPLICATION —All double layer coverings to have staggered joints, first layer being firmly wired or otherwise secured in place. External finish of covering to be standard pasted canvas jackets and metal bands on 18-in. centers. Canvas to be painted with one coat of cold water paint or sized and painted with two coats of lead and oil paint of color desired. Alternate finish may be 8 oz. canvas applied over building paper with Carey Metal Stitch or hand sewed three stitches per inch.

• OTHER EQUIPMENT

Fittings and Flanges

Cover with Block or Cement of same material to the same thickness as adjacent coverings (except 85% Magnesia Block to be used with Laminated Asbestos Coverings and Hair Felt to be used with Wool Felt type Coverings) smoothly finished with pasted canvas jacket.

Boiler Drums, Tanks, Receivers, Separators, etc.

Use same materials and thicknesses as specified for pipes 12 in. and larger, carrying the same temperature or pressure, finished with ½-in. No. 100 Hard Finish Cement (additional canvas finish optional).

Boiler Stacks

Line with 2-in. thick Vitricel Sheets curved to fit. Install on angle iron rings spaced 36½ in. apart. Fill all cracks and joints and finish flush with Vitricel Cement.

Boiler Water Walls

Apply MW-40 and MW-50 Cement to make a smooth surface. Follow with two layers of 2-in. thick 85% Magnesia Blocks, broken joint construction. Finish with Careystone Panels or ½-in. No. 100 Hard Finish Cement.

Boiler Breechings

Line with 2-in. thick Hi-Temp No. 15 Blocks firmly secured in place and finished with ¾-in. thickness Carey Vitricel Cement applied in two layers and reinforced with expanded metal.

Note: For breechings above 1000° F. use Hi-Temp No. 19 Blocks.

Alternate—Insulate breechings externally with 2-in. thick Hi-Temp. No. 15 Blocks applied over mesh or netting to give ¾-in. air space and finish with ½-in. thickness Carey No. 100 Hard Finish Cement.

Tempered Air Ducts and Fan Housings

Cover with 1-in. thick Careycel Blocks or Sheets followed by 16-lb. Asbestos Paper to make a smooth surface and finished with 8-oz. pasted canvas jacket and paint.

Economizer and Air Preheater Ducts

Line with 2½-in. thick Hi-Temp No. 15 Blocks firmly secured. Finish with ¾-in. thick Vitricel Cement applied in two layers and reinforced with expanded metal lath.

Outdoor Pipes and Equipment

Waterproof pipe insulation with 45-lb. per square asphalt roofing jackets held in place with 16-gauge copper wire or copper-clad wire on 6-in. centers—2-in. laps in all directions. Waterproof valves, fittings, tanks, etc., with ¼-in. thick (dry) Thermotex asphalt emulsion, applied in two layers.

HIGH TEMPERATURE INSULATION . . . . .

CAREY HI-TEMP NO. 19

Carey Hi-Temp No. 19 consists essentially of a mixture of diatomaceous earth and asbestos fibre bonded and molded into commercial size blocks and pipe covering sections. The diatomaceous earth has been calcined or burned at a temperature of approximately 2200° F. to limit shrinkage of the finished product in service.

PHYSICAL PROPERTIES

Non-corrosive either wet or dry.

Molded shapes weigh approximately 27 lbs. per cu. ft.

Crushing strength, cold—approximately 65 lbs. per sq. in.; at 1600° F. approximately 110 lbs. per sq. in.

Recommended for temperatures up to 1900° F.

Heat expansion up to 1900° F.—none.

Heat shrinkage—1000° F., 0.25%; 1500° F., 0.70%; 1900° F., 3%.

Tough structure due to use of asbestos fibre.

Low heat conductivity—see chart.

USES

Ovens, Furnaces, Kilns, Lehrs, Regenerating Chambers, Breeches, Ducts, etc., where internal temperatures run as high as 2500° F. or higher.

METHODS OF INSTALLATION

Blocks may be applied by any of the conventional methods for application of insulating block, the usual care being exercised to wire or otherwise firmly secure them in place. Special specification for method of installation inside of breechings or hot gas ducts will be furnished on request. All cracks and joints should be carefully pointed up with Hi-Temp No. 19 Cement. Exposed block surfaces may be finished with any type of trowelling cement which should always be reenforced with wire mesh or expanded metal lath.

AVAILABLE COMMERCIAL SHAPES

Blocks, flat, 6 in. wide by 36 in. long, 1 to 4 in. thickness.

Blocks, flat, 12 in. wide by 36 in. long, 1½ to 4 in. thickness.

Blocks, curved from 36 to 96 in. diameter, 6 in. wide by 36 in. long, 1½ to 4 in. thickness.

Pipe Covering in semi-cylindrical sections 36 in. long, 1½, 2 and 2½ in. thick, for pipes up to and including 10 in. size.

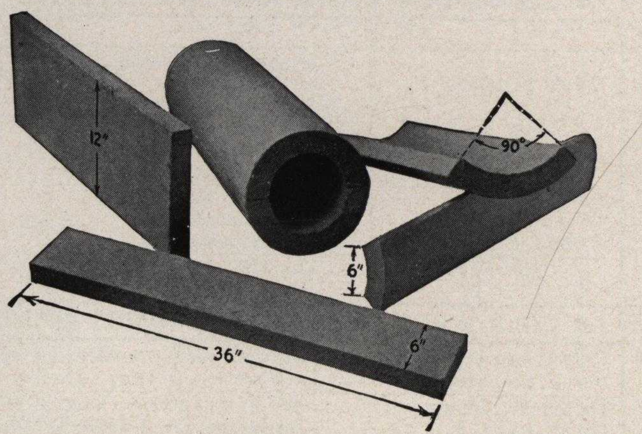
Pipe Covering, curved segmental blocks, approximately 6 in. wide and 36 in. long, 1½ to 3 in. thick inclusive, for pipe sizes 12 to 30 in. inclusive.

Segments per Section—all thicknesses

12″ pipe size	8 segments	22″ pipe size	13 segments
14″ pipe size	9 segments	24″ pipe size	15 segments
16″ pipe size	10 segments	26″ pipe size	16 segments
18″ pipe size	11 segments	28″ pipe size	17 segments
20″ pipe size	12 segments	30″ pipe size	18 segments

Pipe Covering, 4 segments 36 in. long per section, in 1½ and 2 in. thicknesses only, for pipe sizes 12, 14 and 16 in. only.

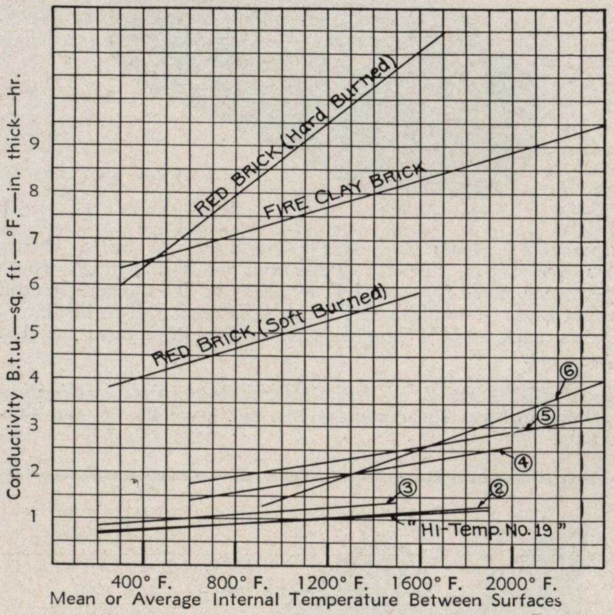
Cement, in dry powder form, in 75-lb. bags—covering capacity approximately 50 sq. ft. 1 in. thick per cwt.



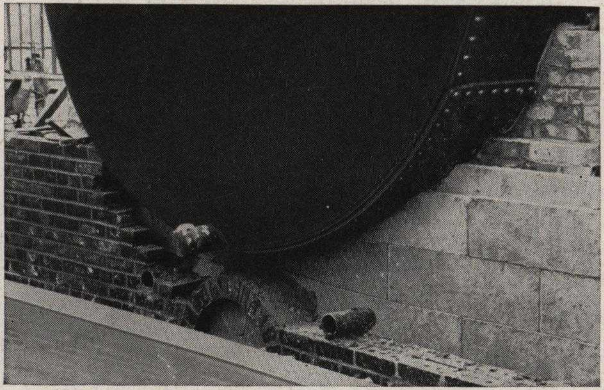
HEAT LOSSES THROUGH FURNACE WALLS WITH VARIOUS THICKNESSES OF HI-TEMP NO. 19

Thickness of furnace wall	Thickness of Hi-Temp. No. 19	Unit losses are in B.t.u. per hour per sq. ft. of surface. Surface temperatures are in °F. Air at 70° F.	Furnace temperature °F.								
			1000	1200	1400	1600	1800	2000	2200	2400	2600
Iron Wall	None	Unit Loss	8500	12700	19100	31500					
	2″	Unit Loss	314	410	502	600					
		Sur. Temp.	209	236	263	290					
	3″	Unit Loss	217	277	342	412					
		Sur. Temp.	175	197	218	240					
4½″ Fire Brick	None	Unit Loss	962	1250	1507	1810	2130	2470			
		Sur. Temp.	371	424	465	510	548	586			
	2½″	Unit Loss	213	262	324	392	464	541			
		Hot Sur. Hi-Temp.	870	1040	1210	1380	1550	1720			
		Sur. Temp.	174	192	212	233	253	275			
	4½″	Unit Loss	133	169	207	248	292	338			
		Hot Sur. Hi-Temp.	920	1100	1282	1463	1645	1825			
		Sur. Temp.	142	157	172	187	202	217			
9″ Fire Brick	None	Unit Loss	524	661	806	959	1120	1291	1470	1657	
		Sur. Temp.	270	306	340	371	400	430	459	488	
	2½″	Unit Loss	184	232	283	337	395	455	519	585	
		Hot Sur. Hi-Temp.	776	925	1074	1223	1372	1521	1670	1820	
		Sur. Temp.	163	181	198	216	234	252	279	287	
	4½″	Unit Loss	121	152	186	222	261	301	344		
		Hot Sur. Hi-Temp.	850	1017	1183	1350	1516	1683	1850		
		Sur. Temp.	135	149	163	176	190	204	218		
13½″ Fire Brick	None	Unit Loss	367	462	563	669	780	897	1020	1149	1283
		Sur. Temp.	225	252	280	306	333	359	383	405	430
	2½″	Unit Loss	161	203	247	294	343	395	450	507	567
		Hot Sur. Hi-Temp.	702	835	968	1100	1234	1367	1500	1633	1765
		Sur. Temp.	154	170	186	202	218	234	250	266	281
	4½″	Unit Loss	110	139	170	202	237	273	311	351	
		Hot Sur. Hi-Temp.	796	951	1106	1260	1415	1570	1725	1880	
		Sur. Temp.	132	145	157	170	183	195	207	221	

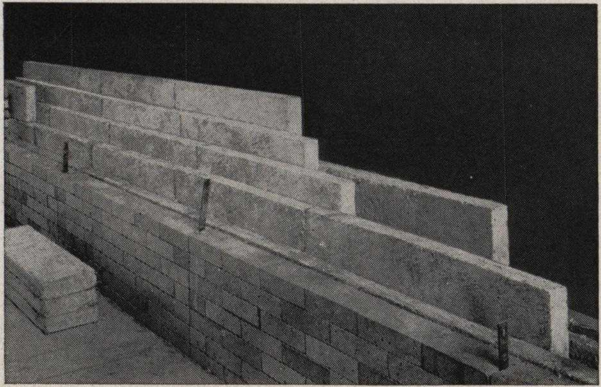
CONDUCTIVITY GRAPH OF CAREY HI-TEMP No. 19 AND OTHER STRUCTURAL AND REFRACTORY MATERIALS



Conductivity of brick and insulating material: (2) Diatomaceous Earth Block; (3) Natural Diatomaceous Earth Brick and best grade Bonded Diatomaceous Earth Brick; (4) Calcined Diatomaceous Earth Brick (2000° F.); (5) Calcined Diatomaceous Earth Brick (2500° F.); (6) Bonded and Burned Diatomaceous Earth Brick (2500° F.).



Brick Fire Box Showing Two-layer Block Installation Between Fire Brick and Red Brick



Annealing Furnace—Showing Multiple Layer Block Installation Between Refractory Block and Steel Casing

DIATOMACEOUS EARTH

DICALITE FINE INSULATING POWDER

The finest grade of diatomaceous earth, used in the manufacture of heat insulating cements, blocks, bricks, etc., and as a filler in hollow insulating walls. In loose form, it weighs from 8 to 8½ lbs. per cu. ft.; poured without tamping, its weight is from 10 to 12 lbs. per cu. ft., and can be tamped to a density of from 15 to 17 lbs. per cu. ft. It is furnished in burlap bags containing 100 lbs. net. It is suitable for temperatures up to 1600° F. Thermal conductivity at 500° F.—0.55; at 1500° F.—0.65.

DICALITE COARSE INSULATING POWDER

A granular form of diatomaceous earth mixed with fine powder, suitable for temperatures up to 1600° F., and is generally used as a dry insulating filler in walls, partitions, etc. Can be mixed five parts powder, one part Portland cement, by volume, with sufficient water to form a stiff paste, and used as an insulating material possessing considerable structural strength. Untamped, it weighs from 15 to 16 lbs. per cu. ft., but can be packed to a density of from 18 to 20 lbs. per cu. ft. It is furnished packed in burlap bags containing 100 lbs. net. Thermal conductivity at 500° F.—0.55; at 1500° F.—0.65.

DICALITE CALCINED AGGREGATE

A semi-refractory insulating material made from Dicalite Rock and calcined to a temperature enabling it to withstand temperatures up to 2200° F. In size, it grades from 4-mesh down to 200-mesh. It weighs approximately 28 lbs. per cu. ft. untamped and 30 to 33 lbs. per cu. ft. when tamped. It is recommended for making insulating concrete by mixing four parts of the aggregate and one part of Portland cement, by volume (30 lbs. of the aggregate to 26 lbs. of Portland cement, by weight), with sufficient water to form a plastic, well-knit mass. It is shipped in burlap bags containing 100 lbs. net. Thermal conductivity at 500° F.—0.865; at 1500° F.—1.555.

Recommendation—Use ¼ in. thick fill for each 100° F. of internal temperature.

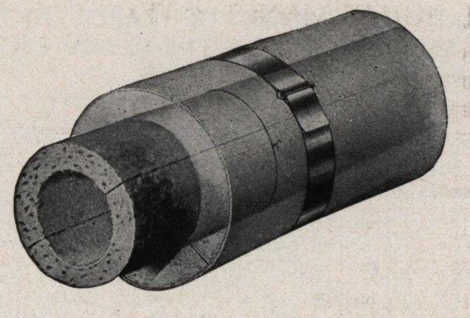
SUPER-HEAT INSULATION . . . .

CAREY HI-TEMP NO. 15

Carey Hi-Temp No. 15 was developed by Carey Research Laboratories after long and careful consideration of many materials in their effort to develop a suitable heat insulation that would satisfactorily meet the following requirements:

1. High insulating efficiency.
2. Ability to resist decomposing effects of continuous exposure to high temperature.
3. Ability to withstand packing, shipping and handling without excessive breakage.
4. Low heat shrinkage.
5. Satisfactory mechanical strength and toughness to withstand handling and reapplication after exposure to high temperatures.
6. Resistance to the effects of moisture.

Diatomaceous silica is stable up to temperatures of approximately 1500° F. With certain types it is possible to secure a light porous structure. A thorough study of this product in combination with asbestos fibre and other bonding and heat insulating materials resulted in Carey Hi-Temp No. 15 which more nearly approaches the ideal combination of all the required properties of high temperature insulation than any product yet offered for this purpose.



USES

Superheated Steam and Hot Oil Lines, Oil Stills, Ovens, Boiler Breechings, Furnace Walls and similar surfaces where temperatures range from 500° F. to 1500° F. It is generally used as a first layer in combination with lower temperature insulating materials, such as 85% Magnesia and others to reduce the first intense heat.

See CONDENSED SPECIFICATIONS Page 3 for Combination Covering thickness recommendations, and page 22 for combination data.

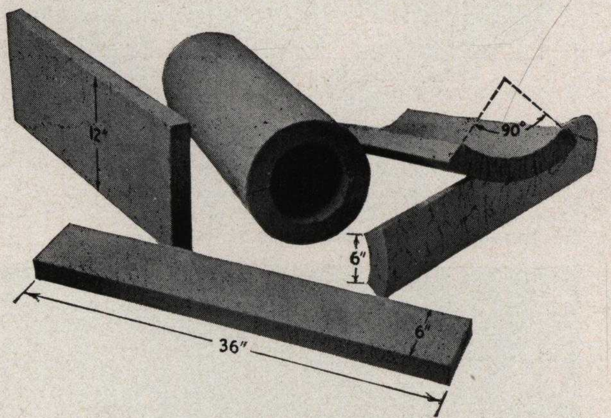
AVAILABLE COMMERCIAL SHAPES

Blocks, flat, 6 in. wide by 36 in. long, 1 to 4 in. thickness.
Blocks, flat, 12 in. wide by 36 in. long, 1½ to 4 in. thickness.
Blocks, curved from 36 to 96 in. diameter, 6 in. wide by 36 in. long, 1½ to 4 in. thickness.
Pipe Covering in semi-cylindrical sections 36 in. long, 1½, 2 and 2½ in. thick, for pipes up to and including 10 in. size.
Pipe Covering, curved segmental blocks, approximately 6 in. wide and 36 in. long, 1½ to 3½ in. thick inclusive, for pipe sizes 12 to 30 in. inclusive.

Segments per Section—all thicknesses

12″ pipe size	8 segments	22″ pipe size	13 segments
14″ pipe size	9 segments	24″ pipe size	15 segments
16″ pipe size	10 segments	26″ pipe size	16 segments
18″ pipe size	11 segments	28″ pipe size	17 segments
20″ pipe size	12 segments	30″ pipe isze	18 segments

Cement, in dry powder form, in 75-lb. bags—covering capacity approximately 65 sq. ft. 1 in. thick per cwt.

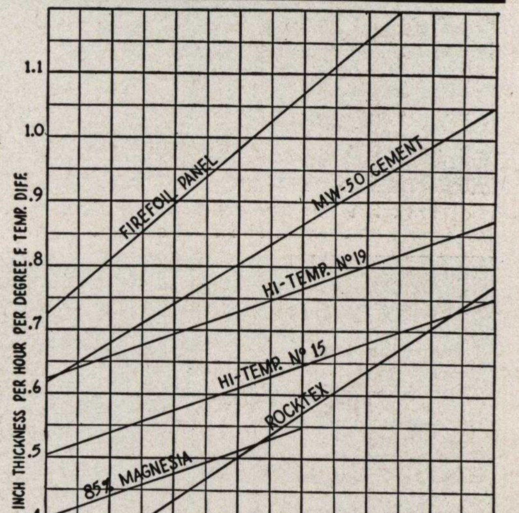


PHYSICAL PROPERTIES OF HI-TEMP NO. 15

Non-corrosive, either wet or dry.
Molded shapes weigh approximately 21 lbs. per cubic foot.
Recommended for temperatures up to 1500° F.
Heat expansion up to 1500° F.—none.
Tough structure due to the use of asbestos fibre.
Low heat conductivity—see chart.

MECHANICAL CHARACTERISTICS WITH INCREASING TEMPERATURES

Temperature° F.	220	1000	1200	1400	1500
Shrinkage, Linear %	.053	0.500	1.13	1.90	2.36
Flexural Strength, lbs. per sq. in.	66.7	49.9	36.6	27.5	30.7
Compressive Strength, lbs. per sq. in.:					
1% deformation	25.4	21.5	24.1	19.3	19.1
2% deformation	50.7	41.0	39.7	33.5	35.2
3% deformation	67.0	52.8	49.6	41.1	44.9
5% deformation	84.1	67.4	59.9	49.6	53.5



TYPICAL PERFORMANCE DATA

(For complete data see Bulletin 101-B)

Inner Layer: Carey Hi-Temp No. 15
Outer Layer: Carey 85% Magnesia

PIPE TEMPERATURE 1000° F.

Pipe Size, inches		3	6	12	Flat
Thickness Hi-Temp No. 15		1 9/16	2 1/16	2 1/8	2 1/2
Thickness 85% Magnesia		1 1/2	2	2	1 1/2
Surface Temp. °F.	Hi-Temp No. 15	531	564	581	543
	85% Magnesia	145	138	143	152
B.t.u. loss per ft.-hr.	insulated	288	372	580	137
	bare	8050	15000	28500	8700

PIPE TEMPERATURE 900° F.

Pipe Size, inches		3	6	12	Flat
Thickness Hi-Temp No. 15		1 9/16	2 1/16	2 1/8	2 1/2
Thickness 85% Magnesia		1 1/2	2	2	1 1/2
Surface Temp. °F.	Hi-Temp No. 15	481	511	527	492
	85% Magnesia	138	131	136	144
B.t.u. loss per ft.-hr.	insulated	251	325	496	119
	bare	6170	11460	21600	6650

PIPE TEMPERATURE 800° F.

Pipe Size, inches		3	6	12	Flat
Thickness Hi-Temp No. 15		1 9/16	1 1/2	1 9/16	2
Thickness 85% Magnesia		2	2	2 1/2	2
Surface Temp. °F.	Hi-Temp No. 15	467	505	550	518
	85% Magnesia	122	130	129	136
B.t.u. loss per ft.-hr.	insulated	193	291	415	99
	bare	4640	8600	16200	5000

PIPE TEMPERATURE 700° F.

Pipe Size, inches		3	6	12	Flat
Thickness Hi-Temp No. 15		1 9/16	1 1/2	1 9/16	2
Thickness 85% Magnesia		2	2	2 1/2	2
Surface Temp. °F.	Hi-Temp No. 15	411	444	483	455
	85% Magnesia	116	123	122	128
B.t.u. loss per ft.-hr.	insulated	162	243	348	83
	bare	3400	6270	11800	3870

PIPE TEMPERATURE 700° F.

Pipe Size, inches		3	6	12	Flat
Thickness Hi-Temp No. 15		1 9/16	1 1/2	1 9/16	1 1/2
Thickness 85% Magnesia		1 1/2	1 1/2	2	2
Surface Temp. °F.	Hi-Temp No. 15	380	420	459	493
	85% Magnesia	123	130	127	132
B.t.u. loss per ft.-hr.	insulated	179	266	390	93
	bare	3400	6270	11800	3870

PIPE TEMPERATURE 600° F.

Pipe Size, inches		3	6	12	Flat
Thickness Hi-Temp No. 15		1 9/16	1 1/2	1 9/16	1 1/2
Thickness 85% Magnesia		1 1/2	1 1/2	2	2
Surface Temp. °F.	Hi-Temp No. 15	329	364	396	424
	85% Magnesia	116	122	120	123
B.t.u. loss per ft.-hr.	insulated	147	217	317	75
	bare	2420	4440	8320	2590

Note: For intermediate temperatures reasonably accurate values can be obtained by interpolating from the table given above.

MINERAL WOOL

For Industrial Ovens, Ducts, etc.
200° F. to 1200° F.
Also Used for Building Insulation

Mineral Wool

Loose Fibre—Packed in paper bags—35 lbs. each. Fills approximately 17 sq. ft. 4 in. thick. Packed in burlap bags—50 lbs. each. Fills approximately 24 sq. ft. 4 in. thick @ 4.375#/cu. ft.

Granulated (Nodulated or Pellet)—Packed in paper bags—35 lbs. each. Fills approximately 17 sq. ft. 4 in. thick. Packed in burlap bags—50 lbs. each. Fills approximately 24 sq. ft. 4 in. thick @ 4.375#/cu. ft.

Insulating Bats—Shipped in cartons. 15 in. x 23 in. or 48 in. x min. 3 in. thick—approximate weight 4 lbs. per square foot.

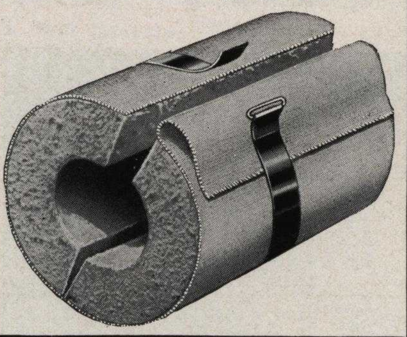
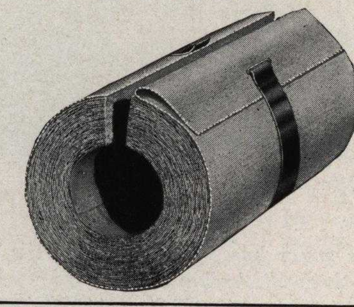
Industrial Bats—Shipped in cartons. Weight per square foot, 4-in. thickness—approximately 5 lbs.

Insulating Blankets—Use 1/2 in. thickness for each 100° F. Thermal conductivity at 100° F.—0.36, at 700° F.—0.71.

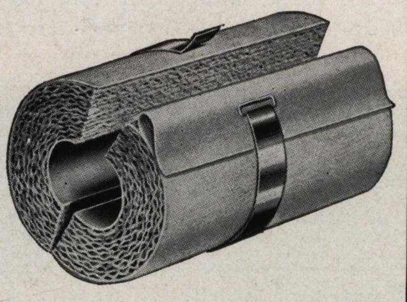
Mineral Wool Blankets

STEAM AND HOT WATER INSULATION

HIGH AND MEDIUM PRESSURE STEAM SURFACES (200° F. to 600° F.)

PRODUCT	USES	DESCRIPTION, SHAPES AND SIZES
CAREY 85% MAGNESIA 	Specifically designed to furnish the highest quality molded heat insulation for medium and high pressure steam surfaces. Should not be used above 550° F.—600° F. For higher temperatures use Hi-Temp No. 15 and 85% Magnesia combination covering. (See Page 3.)	Carey 85% Magnesia is a molded composition of not less than 85% basic carbonate of magnesia and approximately 15% asbestos fibre. It is the accepted quality standard for high and low pressure work where maximum permanent efficiency is desired. Furnished in sections and segments for covering pipes. Flat block furnished in standard sizes of 6x36 in., 6x18 in. and 3x18 in. in thicknesses from ⅞ to 4 in. Curved blocks (for 30 to 96-in. diameters) furnished in 6-in. width and lengths up to 42 in. Dry powder or cement for irregular surface is described on Page 10. For specification recommendations see Pages 2 and 3.
CAREY MULTI-PLY 	Designed especially to provide highly efficient all-asbestos heat insulation for medium and high pressure steam surfaces with a tough flexible structure which will prevent damage in service. Will withstand much more abuse than molded insulation.	Multi-Ply consists of numerous layers of fine asbestos felts firmly bonded with narrow strips of heatproof adhesive spaced approximately 3 in. apart. This construction gives a minimum area of contact between solid particles in successive layers and a maximum resistance to transfer of heat by conduction. Furnished in 36 in. long sections, including cotton duck jacket and bands, for all pipe sizes in thicknesses of 1, 1½, 2 in. (single or double layer), 2½ and 3 in. (double layer only). Blocks 6x36 in. and sheets 36x36 in. in thicknesses from 1 to 3 in. inclusive are furnished for large surfaces.
CAREY ASBESTOS-SPONGE	Recommended for unusually severe service conditions.	Carey Asbestos-Sponge insulation is similar to Multi-Ply in construction except that particles of sponge are imbedded in the felt of which it is made. It has the same high thermal efficiency but a somewhat heavier denser structure than Multi-Ply. Furnished in the same shapes and sizes as Multi-Ply.

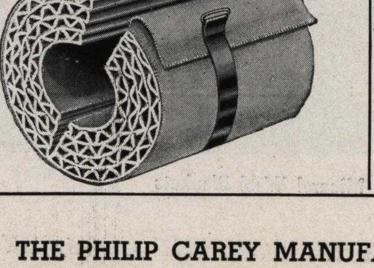
LOW PRESSURE STEAM AND HOT WATER SURFACES (100° F. to 300° F.)

CAREYCEL 	Careycel Pipe Coverings and Blocks are designed especially to insulate pipes, boilers, insulated metal boiler jackets, ovens and other apparatus carrying temperatures of not over 300° F.	Furnished in 36-in. long pipe covering sections with cotton duck jacket and bands for all pipe sizes. Standard thickness, 1 in. Blocks 6x36 in., sheets 36x36 in. or cut sizes to order. Thicknesses from ½ in. up.

EFFICIENCY OF CAREYCEL PIPE COVERING

Steam Pressure		Hot Water		10 lbs.		80 lbs.		120 lbs.	
Steam Temp. °F. Temp. Diff. °F.		180° F. 100° F.		239.4° F. 159.4° F.		324.0° F. 244.0° F.		350.0° F. 270.0° F.	
Thickness, in.	Pipe Size, in.	% Eff.	Loss	% Eff.	Loss	% Eff.	Loss	% Eff.	Loss
1	3	80.7	39.0	82.1	65.7	83.8	108.6	84.3	122.5
	6	82.2	65.0	83.6	109.3	85.2	180.2	85.7	204.0
	12	83.0	114.1	84.3	193.0	85.9	319.0	86.3	362.0

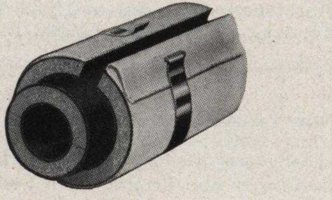
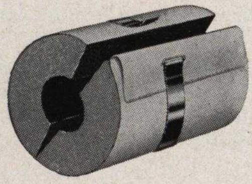
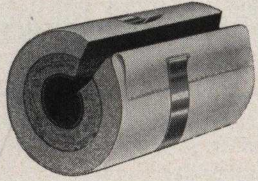
The columns headed "loss" give the loss in Btu. per lineal foot of pipe at the temperature difference indicated, per hour.

CAREY AIRCEL—4 Ply **CAREY EXCEL—6 Ply** 	Four plies of corrugated asbestos paper per inch of thickness.	Furnished in 36-in. long sections with cotton duck jacket and bands ½, ¾ and 1 in. thick. Blocks and sheets same as Careycel.
	Six plies of corrugated asbestos paper per inch of thickness.	Furnished in sections or sheets same as Careycel. Regular thicknesses ½ and 1 in.

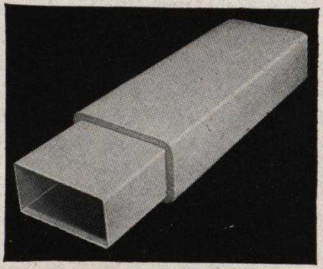
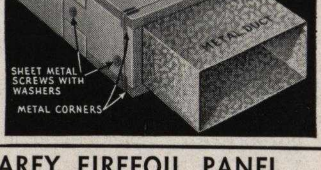
NOTE: All Carey pipe coverings are made to fit Copper Tubing as well as iron pipe in the following kinds and sizes:

85% Magnesia—*Iron Pipe:* From ¼-in. nominal diameter up.
Copper Tubing: From ¼-in. nominal diameter to and including 6 in.
All Laminated Felt Coverings—*Iron Pipe:* From ¼-in. nominal diameter up.
Copper Tubing: From ¼-in. nominal diameter up.

COLD WATER INSULATION

<table>
<tr><th>PRODUCT</th><th>USES</th><th>DESCRIPTION, SHAPES AND SIZES</th></tr>
<tr><td>CAREY IMPERVO
For Ice Water Pipes—Non-Sweat
</td><td>Designed for use on ice water and cold water pipes to keep water cold and prevent sweating.
Double layer construction should always be used with joints and seams staggered. It is important to keep air away from the pipes.</td><td>Carey Impervo Covering is composed of insulating felt with waterproof felt liners and jackets applied to each layer. Furnished in sections 3 ft. long, canvas covered, with bands for applying for all pipe sizes. Regularly made in double ½ in. and double ¾ in. thicknesses. Other thicknesses to order.
The table shows the proper thickness to prevent sweating for various differences of temperature between air and water in the pipe and for various degrees of humidity.
<table>
<tr><th rowspan="2">Humidity</th><th colspan="3">Temp. Diff. °F.</th></tr>
<tr><th>50° F. Max., in.</th><th>60° F. Max., in.</th><th>70° F. Max., in.</th></tr>
<tr><td>Up to 70%....</td><td>1</td><td>1</td><td>1½</td></tr>
<tr><td>70% to 80%...</td><td>1½</td><td>2</td><td>2</td></tr>
<tr><td>80% to 85%...</td><td>2</td><td>2½</td><td>3</td></tr>
</table></td></tr>
<tr><td>CAREY PERFECTO
For Cold or Hot Water Pipes
</td><td>Designed to provide inexpensive insulation for cold water pipes and gives fair results in preventing sweating or freezing.</td><td>Perfecto pipe covering consists of laminations of insulating felt with an All Service liner suitable for hot or cold pipes.
Furnished in 36-in. long sections, with cotton duck jackets and bands, in ½, ¾, 1 in. double ½ in. and double ¾ in. thicknesses.</td></tr>
<tr><td>CAREY PROTECTO
To Prevent Freezing
</td><td>Designed especially to reduce the danger of freezing of exposed water pipes.</td><td>Carey Protecto pipe covering consists of an inner layer of hair felt with a waterproof felt liner and an outer layer of insulating felt. The total thickness is approximately 1 in. For severe conditions two thicknesses should be used. Furnished in 36 in. long sections, with cotton duck jackets and bands, in one thickness only.</td></tr>
</table>

AIR CONDITIONING DUCTS AND EQUIPMENT

<table>
<tr><td>CAREY DUCT
For Covering Conditioned Air
</td><td>For efficient conveyance of conditioned air it comprises both duct and insulation and is erected in a single operation.</td><td>Fireproof; permanent; a natural sound deadener; no noise in erection; lightweight; clean appearance; easy to erect; low cost as compared to sheet metal plus insulation; permits higher velocities, thereby requiring smaller ducts. Write for Careyduct catalog.</td></tr>
<tr><td>CAREYCEL
For Insulating Ducts

 </td><td>A fireproof, low cost, high efficiency asbestos board for the insulation of ducts and all types of air conditioning equipment.</td><td>Composed of laminations of indented (not corrugated) asbestos felts (approximately 12 to 14 per inch of thickness. Lightweight (approximately 1½ lbs. per board foot).
Standard size sheets 36 x 36 in. or 72 in., or cut in sizes to order. Blocks 6 x 36 in. Thicknesses from ½ in. up.</td></tr>
<tr><td>CAREY FIREFOIL PANEL</td><td>For plenum chambers, large ducts, etc.</td><td>See Page 12</td></tr>
</table>

CEMENTS • INSULATING, BONDING, ETC.

SELECTION GUIDE—CAREY CEMENTS

USE	RECOMMENDATION
Pointing-Up	**Pointing Up**—For pointing up and filling cracks, 85% Magnesia or Hi-Temp No. 15 Cements should be used with the corresponding molded insulation. These cements are not recommended for hard finishing or insulating large areas. For pointing up laminated or molded Asbestos Insulations, No. 707 Cement is the most desirable.
Finishing	**Finishing**—For a smooth, reasonably hard finish over molded insulation, use No. 303 or No. 707 Asbestos Cements. For a very hard, smooth, plaster-like finish over block insulation, particularly on large areas, where shrinkage cracks are to be avoided, No. 100 Cement is the most satisfactory.
Fittings	**Fittings**—For small, solid Asbestos Cement Fittings, use No. 303 or No. 707 Cement to the desired thickness. For larger fittings which are first blocked in, use either of these cements as a finish coat. For large fittings where solid cement insulation is required, use MW40 or MW50 for best results.
Boilers Tanks Stills, Etc.	**Boilers, Tanks, Stills, etc.**—For large area solid monolithic cement construction, use MW50 Cement. This cement combines maximum insulating value, reasonable hardness, a tough structure, excellent sticking properties and minimum cracking. For a very smooth, hard outer finish, use No. 100, No. 303, or No. 707 Cement.
Stack and Breeching Lining	**Stack and Breeching Lining**—For pointing up stack or breeching insulation and covering metal parts, use Vitricel Cement. Use Vitricel No. 10 for temperatures up to 1000° F. and No. 19 for temperatures up to 1900° F.
Refractory Coating and Patching	**Refractory Coating and Patching**—For setting up and patching refractory linings, iron furnace bowls, etc., use No. 20 Furnace Cement. This cement may also be used as a wash coat over insulation to give a very hard, abrasion-resisting, refractory finish. It should not be used for trowel coating insulation. For a heavy refractory trowel coat use Vitricel Cement.
Bonding	**Bonding**—Use Carey Fibrous Adhesive for bonding insulating blocks to metal surface or to each other where wire reinforcement is impractical or inadequate.
Waterproofing	**Waterproofing**—For a thin waterproofing film, Fibre Coating may be applied with a brush. For heavy waterproof trowel coating, ¼ in. to ½ in. thick Thermotex is the most desirable.

INSULATING CEMENTS

85% MAGNESIA

85% Magnesia Cement is the most efficient insulating cement. Supplied in 60-lb. bags. Covering capacity approximately 35 to 40 sq. ft., 1 in. thick per bag. Good for temperatures up to 600° F. Use for pointing up and filling cracks in 85% Magnesia molded insulation. Not recommended for hard finishing or insulating large areas. Conductivity 100° F.—.45, 500° F.—.65.

HI-TEMP No. 19

Hi-Temp No. 19 Cement is designed for use with Carey Hi-Temp No. 19 Blocks for sealing joints, pointing up, and filling irregular spaces. Furnished in 75-lb. bags. Suitable for temperatures up to 1900° F. Covering capacity approximately 50 sq. ft. 1 in. thick per cwt. Not recommended for hard finishing or insulating large areas.

Conductivity—500° — .76, 1500° — 1.11.

HI-TEMP No. 15

Hi-Temp No. 12 Cement is the most efficient superheat insulating cement. Furnished in 75-lb. bags. Covering capacity approximately 65 sq. ft., 1 in. thick per cwt. Good for temperatures up to 1500° F. Use for pointing up and filling cracks in Hi-Temp No. 12 molded insulation. Not recommended for hard finishing or insulating large areas. Conductivity 100° F.—.69, 700° F.—.81

MW-40, MW-50

MW-40 and MW-50 are two of the most efficient insulating cements for large area monolithic construction on furnace walls, stills, tanks, boilers, etc. These cements combine maximum insulating value with toughness, reasonable hardness and excellent sticking properties. Suitable for temperatures up to 1600° F. Can be troweled reasonably smooth. For very smooth finish, trowel surface with No. 303 or No. 100 hard finish cement. Furnished in 50-lb. bags. Dry covering capacity for MW-40 and MW-50 approximately 40 sq. ft. and 50 sq. ft. respectively, 1 in. thick per cwt. Conductivity 100° F.—0.58, 600° F.—0.93.

No. 707

No. 707 Asbestos Cement is a long fibre grade of insulating cement with good insulating value. Should be used as a finish coat, for pointing up molded insulation and for covering small fittings. Is reasonably hard and trowels smooth. Suitable for temperatures up to 1000° F. Furnished in 100-lb. bags. Covering capacity approximately 25 sq. ft., 1 in. thick per bag. Conductivity 100° F.—1.15, 500° F.—1.51.

No. 303

No. 303 Asbestos Cement is a general utility cement for finishing, pointing up, fittings, etc. Is similar to but a less expensive grade than No. 707 Cement. Furnished in 100-lb. bags. Covering capacity 18 to 20 sq. ft., 1 in. thick per bag. Conductivity 100° F.—1.4, 500° F.—1.7.

BONDING, WATERPROOFING, REFRACTORY CEMENTS

FIBROUS ADHESIVE—Bonding

Carey Fibrous Adhesive is used for sticking insulating blocks to surfaces where the usual method of wiring is difficult or impractical. Fibrous Adhesive is a fibrous plastic material of thin troweling consistency. It is supplied in 5-gal. metal pails weighing approximately 67 lbs. gross, and in 55-gal. metal barrels weighing approximately 670 lbs. gross. One gallon is needed to apply from 25 to 30 sq. ft. of block insulation.

THERMOTEX-B—Waterproofing

A waterproof trowel coating for insulation involving minimum fire hazard. See complete description on page 11.

VITRICEL CEMENTS—Refractory No. 10 and No. 19

Vitricel Cement is a dry semi-refractory hydraulic setting cement. It should be used for pointing up joints and cracks in Vitricel Stack and Breeching Lining and for covering exposed metal parts. Resists moisture. Vitricel No. 10 suitable for temperatures up to 1000° F. Vitricel No. 19 suitable for temperatures up to 1900° F. Drying shrinkage, .5%; heat shrinkage 3.5%. Covering capacity 17 sq. ft., 1 in. thick per 100 lbs. Furnished in 50-lb. bags.

No. 20 FURNACE CEMENT—Refractory Bonding

No. 20 Furnace Cement is a wet plastic refractory cement ready for use. Suitable for temperatures up to 2000° F. Designed for setting refractory brick and tile and for patching iron and refractories. Not designed for trowel coating insulating materials. May be used as a brush coating in layers approximately $\frac{1}{16}$ in. thick. For this purpose it should be thinned to a paint consistency with a dilute solution of silicate of soda and water. Linear drying shrinkage 3.5%. Heat shrinkage up to 1900° F. 5%. Covering capacity approximately 22 sq. ft., $\frac{1}{2}$ in. thick per 100 lbs. Furnished in 1-lb., 5-lb., 10-lb., 50-lb. and 100-lb. cans; also 400-lb. and 650-lb. barrels.

B.t.u. CEMENT—Air-Tight Coating

Carey B.t.u. cement is designed to protect boiler settings from the infiltration of cold air. Apply over the entire surface to a thickness of at least $\frac{1}{16}$ in. with a large plasterer's trowel. Effects savings in fuel up to 10%. Covering capacity approximately 200 square feet $\frac{1}{16}$ in. thick per 100 pounds. Furnished in 600-lb. drums, 300-lb. kegs, 500-lb. pails, 30-lb. kits, 10-lb. cans (4 per carton).

No. 100 CEMENT—Hard Finish

No. 100 Asbestos Cement is a hard finish cement to be used as a final protective coating over block work or other insulating cement. Furnished in 100-lb. bags. Covering capacity approximately 20 sq. ft., 1 in. thick per cwt. Conductivity 100° F.—1.15.

WEATHERPROOFING

Wet heat insulating materials lose all their heat-saving qualities. Adequate weatherproofing is absolutely essential for exposed steam pipe lines, insulated tanks, stills, and other outdoor equipment. A few Carey Weatherproofing materials most effective and desirable for protecting heat insulations are given on this page. Consult our engineering department for specifications.

CAREY THERMOTEX-B

A combination of asbestos fibres and emulsified asphalt forming a cold plastic waterproof cement for application by trowel in one or more coats. Recommended for use as a waterproof coating over insulation applied on equipment exposed to the weather. It is the most fire resisting of all asphalt waterproofing coatings. It shrinks in drying to one-half the wet thickness. Covering capacity 30 sq. ft., $\frac{1}{4}$ in. finished dry thickness per 100 lbs. or $2\frac{3}{4}$ sq. ft. $\frac{1}{4}$ in. finished dry thickness per gallon. Furnished in 500-lb. drums, 300-lb. kegs, 100-lb. kegs, 50-lb. pails and 10-lb. cans.

CAREY FIBRE COATING

A combination of asbestos fibre and liquid asphalt forming a cold fibrous asphalt waterproof coating for application by brush or mop, for use as a preservative over roofing or waterproofing surfaces. Applied in two coats it makes an excellent waterproofing for hard finish asbestos cement surfaces exposed to the weather. When dry it forms a thin fibrous asphalt enamel. Covering capacity approximately $1\frac{1}{2}$ gal. per 100 sq. ft. Furnished in 50-gal. barrels, 30-gal. kegs, 5 and 3-gal. pails and 1-gal. cans.

CAREY ASBESTOS FELTS

WHITE TOP ROOFING—3 PLY

Asbestos Asphalt Saturated Felt plied together with a white asbestos sheet on one side.

Because of its fire resisting white outer surface, and its waterproof qualities, White Top Roofing is used extensively in waterproofing insulation materials on pipe lines, tanks, stills, etc.

Furnished in rolls 36 in. wide containing 108 sq. ft.; weight approximately 55 lbs.

DOUBLE SANDED ASBESTOS

A long fibre asbestos felt thoroughly saturated and coated on both sides with tempered asphalt. Smooth finish with sand surfaces both sides.

Weight—65 lbs. per square. Furnished in rolls 36 in. wide containing 108 sq. ft. (one square).

Most desirable roofing for making separate roofing jackets for pipe coverings, and for weather-proofing exposed insulated tanks and similar equipment.

FIBEROCK ASBESTOS FELT

Saturated only and recommended for underground pipe covering, particularly the 10-lb. sheet, which is firmly attached to the pipe covering in two or more layers as required by specifications.

ASBESTOS GRAPEVINE FINISH FELT

Saturated and coated felt weighing 52 lbs. per 108 sq. ft. finished in rolls 36 in. x 36 ft.

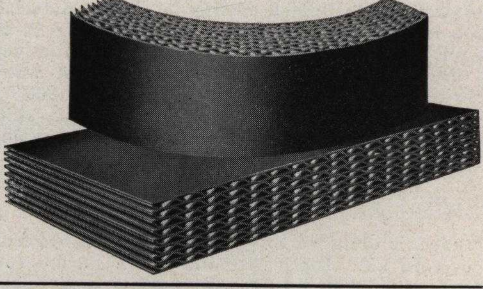
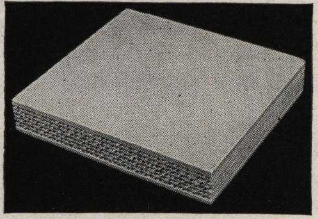
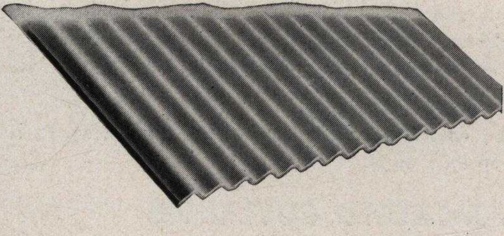
ROOFING JACKETED COVERINGS

FOR OUTDOOR STEAM PIPES

Prepared roofing jackets attached to pipe coverings at the factory give the least expensive form of waterproofing. Multi-Ply, Asbestos-Sponge, Careycel, Impervo and Protecto coverings can be furnished with such roofing jackets attached, including 6-in. wide collars for covering butt joints, and waterproof cement and staples for application. For outdoor exposed pipes Carey Surety roofing jacketed coverings are recommended. For pipes running in closed conduits under ground double layer Fiberock Asbestos Roofing jackets are recommended.

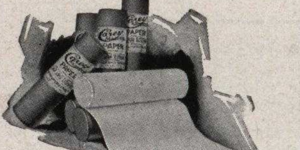
SHEET AND PANEL INSULATION

FOR OVENS, KILNS, DRIERS, ETC.

PRODUCT	USES, DESCRIPTION, SHAPES, SIZES
VITRICEL ASBESTOS SHEETS **For Stack and Breeching Lining** 	Especially designed for steel stacks and breechings where protection, light weight and resistance to moisture are of more importance than maximum insulating value. Will withstand temperatures up to 800° F. Thermal conductivity at 700° F.—2.15 B.t.u. per hour per sq. ft. per degree F. per in. thickness. For higher thermal efficiency, Hi-Temp No. 15 or Alumino Hi-Temp blocks are recommended. **Shapes and Sizes** Furnished in standard flat sheets 36x36 in. or standard curved sheets 24x36 in. curved to fit any stack curvature. 2 in. thickness recommended but other thicknesses will be made to order. Weight approximately 4 lbs. net per sq. ft. for 2 in. thickness and in proportion for other thicknesses.
PANEL BOARDS **For Oven Panels (200° F. to 1200° F.)** 	Recommended for oven insulation at temperatures up to 1200° F. Panel board is sufficiently strong so that no metal oven walls are needed. A 6-ply to the inch corrugated asbestos felt structure, heavily reinforced on each side, with all edges and all surfaces heavily vitrified; furnished in standard sheets 3 ft. wide by lengths up to 9 ft., in thicknesses 1 in. and larger; special size sheets to order.
FIREFOIL PANEL **For Bulkheads, Air-Conditioning Housings, Air-Cooled Boiler Walls, Industrial Oven Walls, Etc.** 	Carey *Firefoil* is composed of fine corrugated asbestos felts, firmly bonded and treated to render it a light weight, strong, rigid, fireproof, waterproof insulating board. *Firefoil Panel* consists of Firefoil surfaced on both sides with cement-asbestos sheathing. Unexcelled for construction of air-conditioning housings, industrial oven walls, paneling for air-cooled boiler walls, large air ducts, etc. Approved by the U. S. Maritime Commission for Class A-1 and Class B fireproof bulkhead construction. *Firefoil* weighs approximately 2 lbs. per board foot, maximum size 48x120 in.; thicknesses from ⅜ in. up. *Firefoil Panel* weighs approximately 3¼ to 3½ lbs. per board foot; maximum size 48x96 in.; thicknesses from ½ in. up. *Firefoil* is a unique insulation material that comprises characteristics of Structural materials.
CAREYSTONE **Asbestos-Cement Sheets** **Flat and Corrugated** 	Careystone Flat Asbestos-Cement Sheathing, and Careystone corrugated, are made of Portland cement and Asbestos. By a special Carey process, long, tough asbestos fibres are evenly distributed through the cement, and this rugged mixture is combined permanently under terrific pressure, and when "cured," has astonishing resiliency and strength. Fire resisting—even the flame of a blow-torch cannot ignite it. No amount of soaking in water can harm it, it's all mineral. Never needs the protection of paint—though it can be given any kind of paint finish the same as ordinary wood. It is ideal wherever there are gases and fumes from industrial operations to contend with. **Standard Sheets Available** Careystone Flat Asbestos Sheathing is made in standard sheets 42x48 in., 48x48 in., 42x96 in., and 48x96 in. Its weight varies in direct proportion to its thickness, the ¼ in. thickness weighing approximately 2½ lbs. per sq. ft. Made in thicknesses ⅛ in. to 2 in. inclusive. Careystone Corrugated Asbestos-Cement roofing and siding is made in standard sheets, 42 in. wide. Standard lengths are 4 to 10 ft. Standard thickness is ⅜ in. average. Weight per square foot 3¾ lbs. Crated approximately 4¼ lbs.
OTHER SHEET and PANEL INSULATION	
Rocktex Blankets	For general industrial plant, oven, and duct use. See lower right page 7.
Multi-Ply	For high and medium pressure steam systems. See upper page 8.
Careycel	For low pressure steam and hot water pipes. See bottom page 8.
Excel	For low pressure steam and hot water pipes. See bottom page 8.
Air Cell	For low pressure steam and hot water pipes. See bottom page 8.

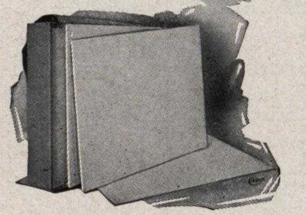
MISCELLANEOUS CAREY PRODUCTS

ASBESTOS PAPER



Asbestos Paper is furnished in 50 and 100 lb. rolls 36 in. wide in weights of 6, 8, 10, 12, 14 and 16 lb., per 100 sq. ft., also in 1/16, 3/32 and ⅛ in. thicknesses.

ASBESTOS MILLBOARD



With New Pinpoint Finish

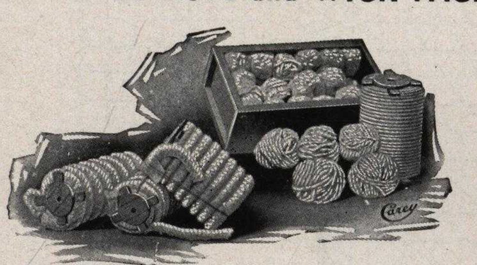
Asbestos Millboard is furnished in standard sheets 42x48 in., in thicknesses from 1/32 to ½ in. It is furnished in two grades—No. 7 Medium or Standard Grade and No. 1, an extra hard grade.

Shipped in approximately 100 lb. net wt. cartons.

WEIGHTS AND THICKNESS OF ASBESTOS MILLBOARD

Thickness, inches	Per Sheet 42 x 48 in., pounds	Per Sq. Ft., ounces	Thickness, inches	Per Sheet 42 x 48 in., pounds	Per Sq. Ft., ounces
1/32	2.0	2.3	3/16	10.35	11.8
3/64	2.8	3.2	¼	14.01	16.0
1/16	3.85	4.4	5/16	17.5	20.0
5/64	4.8	5.5	⅜	20.28	23.1
3/32	5.82	6.6	½	26.53	30.3
⅛	6.93	7.9	⅝	34.3	39.2
5/32	9.0	10.3	¾	39.8	45.5

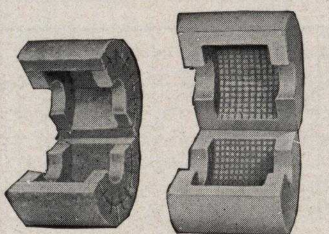
ASBESTOS ROPE and WICK PACKING



Asbestos Rope and Wick Packing—Wick Packing approximately ¼ in. diameter is furnished in ½ and 1 lb. balls, packed in 50 lb. cases. Rope Packing is furnished in reels of 25 and 50 lb. each, in sizes from ½ to 2 in. in diameter. Weights of various sizes are approximately as follows:

Packing Size.......	¼	⅜	½	⅝	¾	⅞	1	1¼	1½	1¾	2
Weight oz. per lin. ft.	⅓	1	1½	1¾	2½	3	4½	5½	9	12	15

CAREY REMOVABLE FLANGE COVERS



Carey Removable Flange Covers are made only of 85% Magnesia materials. They are furnished in two forms as follows:

Standard — Flange Covers consisting of necessary blocks cut to shape, including staples, canvas and bands for assembling on the job.

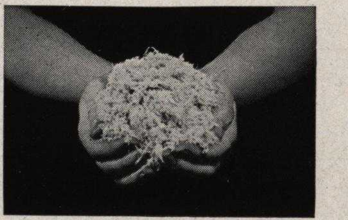
Wire Mesh — Flange Covers consisting of 85% Magnesia materials reinforced with wire mesh finished with canvas jacket including bands for applying. Supplied in finished form direct from the factory. Both types are furnished either 1 in. or 2 in. thick for either standard flanges or extra heavy flanges.

CORRUGATED ASBESTOS PAPER

Corrugated Asbestos Paper is a flexible structure consisting of a flat asbestos sheet to which is attached a corrugated asbestos sheet. It is recommended for covering hot air furnace pipes, ducts, etc., where flexible asbestos insulation is required. It is furnished with coarse corrugations approximately ¼ in. deep, fine corrugations ⅙ in. deep and extra fine corrugations approximately ⅛ in. deep, in rolls 37 in. wide containing 250 sq. ft. each. Weight is approximately 50 lbs. per roll.

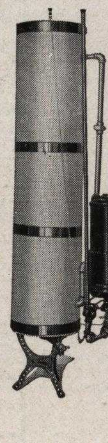
CAREY A-101 ASBESTOS CEMENT

Boiler Expansion Joint Resilient Filler



A long fibre asbestos composition of springy construction. It is designed specifically for filling or cementing expansion spaces in boiler settings to provide an elastic, relatively gas-tight expansion joint. A-101 is packed in 50-lb. bags.

ASBESTOS TANK JACKETS

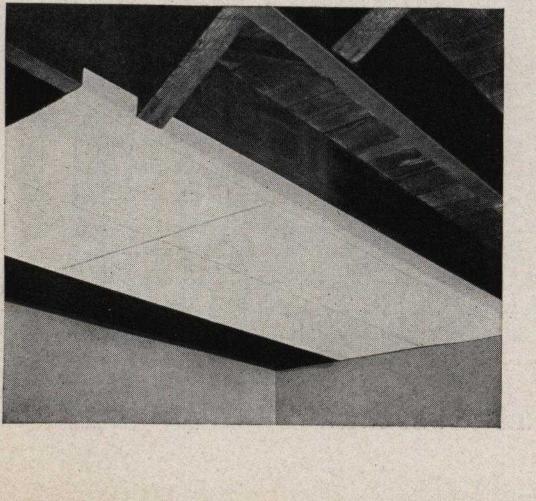


The Carey Improved Careycel Jacket represents the perfect range boiler insulation.

Heat losses with a Careycel Jacket are 30% less than with the ordinary commercial Air Cell Type of Jacket. Increased efficiency and saving at no additional cost.

Carey Improved Careycel Jackets are available in several different finishes, furnished in standard 30, 40, 52, 66, 82 and 100 gallon sizes; also special sizes. It will pay you to investigate.

CAREY A-D BOARD for Return Duct



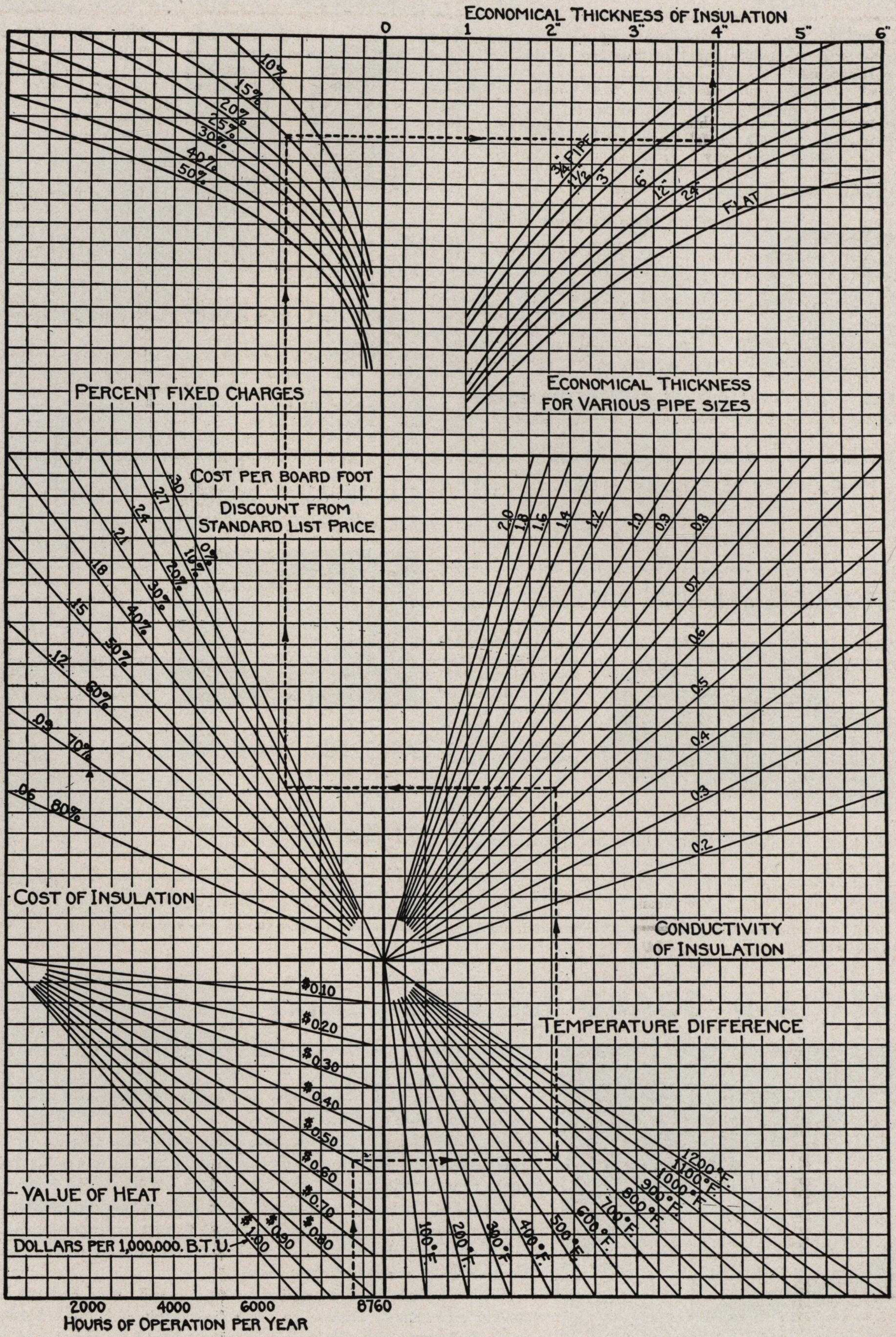
Carey A-D Board is a strong, tough, laminated board especially designed for use in fabricating return ducts by nailing across two joist bays. It is furnished in sheets 33 in. wide for standard joist spacing of 16 in. and has a center line for ready location of the center joist.

Carey A-D Board is finished both sides with white asbestos felt. No additional finish is required but if desired A-D Board can be readily painted with casein or cold water paints; after sizing, lead and oil can be used.

Carey A-D Board is odorless and clean and contains no asphalt or organic adhesive. There is nothing in the product to rust or deteriorate with use. It will not conduct electricity. Due to the nature of the material, it will produce far more quiet ducts than sheet metal.

Carey A-D Board can be easily cut to size and shape and can be applied quickly with nails or staples. To secure best results and a neat finished appearance, all lateral joints and exposed edges should be taped with 4-in. wide Asbestos Paper ribbon cemented in place.

SELECTION CHART . . . .



SELECTION CHART FOR DETERMINING THICKNESS OF INSULATION

. . . . FOR DETERMINING INSULATION THICKNESSES

The selection chart for determining satisfactory thickness of Heat Insulation (opposite page) as prepared by R. H. Heilman, Senior Industrial Fellow, Mellon Institute of Industrial Research, University of Pittsburgh, can be used under normal conditions without further calculations.

Due to the fact that the thicknesses as calculated for various conditions will not always fall on smooth curves, these chart thicknesses may vary slightly from calculated thicknesses. However, this chart is sufficiently accurate for all practical purposes, and its use should enable the engineer to determine the economical thickness of heat insulation for most cases, with the exception of very high temperature conditions such as are met in the refractory field.

The chart provides for practically all variables met with in engineering practice. These variables, briefly discussed are as follows:

1. HOURS OF OPERATION PER YEAR. Where the plant is not in operation the entire year, the actual number of hours per year that the steam is in the lines should be used.

2. VALUE OF HEAT IN DOLLARS PER 1,000,000 Btu. Actual value of heat at the point where the insulation is to be installed.

3. TEMPERATURE DIFFERENCE. Temperature of the metal surface over which the insulation is to be applied minus temperature of the surrounding air. For saturated steam the metal temperature will usually be practically the same as the steam temperature. For superheated steam a metal temperature about 15° F. lower than the steam temperature is often assumed.

4. CONDUCTIVITY OF INSULATION. Values given in the chart are Btu. per square foot per degree temperature difference per hour per 1 in. thick.

5. COST OF INSULATION. Values are given in per cent discount from the standard list price and also per board foot. The total cost of the installation applied in place should always be used, remembering that the applied cost of thick insulation, in terms of list price, is less than that of lesser thickness insulation.

6. PER CENT ANNUAL FIXED CHARGES. The value to use depends upon the return required on the investment, the depreciation, etc. For power plant work a value of twelve to fifteen per cent is generally used. When the insulation is installed for a comparatively short time, a higher rate should be used.

7. SHAPE OF SURFACE. Curves are given for different pipe sizes and for a flat surface. When the desired pipe size is not shown in the chart, the economical thickness can be obtained by interpolation.

The dotted line on the chart illustrates its use in solving a typical problem.

TABLES—FOR DETERMINING INSULATION THICKNESSES

The data in the following tables have been calculated to give recommended thicknesses for a range of normal operating conditions, for 8,760 hours per year with a return of 15% on the last increment of thickness. These tables refer particularly to 85% Carbonate of Magnesia Covering, but can also be used for any type of pipe covering having approximately equivalent efficiency.

The tables are based on average conditions. In transforming, steam cost to coal cost it has been assumed that 75% of the cost of steam is coal cost; that 1 lb. of coal will evaporate approximately 7 lbs. of water and that each lb. of steam contains 1000 B.t.u. above the feed water temperature.

Steam at 25¢ per Million Btu.

Approximate Cost of Coal $2.60 per Ton

Size Pipe	Hot Water 175° F.	Steam 5 lbs.	Steam 200 lbs.	200 lb. 150° F. Super-heat	200 lb. 200° F. Super-heat
¾″	S	S	S	1½	1½
1½″	S	S	1½	1½	1½
3″	S	S	1½	D.S.	D.S.
6″	S	1½	1½	D.S.	D.S.
12″	1½	1½	2	2½	2½
24″	1½	1½	2	3	3
Flat	1½	2	2½	3	3

S—Standard thickness.

Steam at 35¢ per Million Btu.

Approximate Cost of Coal $3.50 per Ton

Size Pipe	Hot Water 175° F.	Steam 5 lbs.	Steam 200 lbs.	200 lb. 150° F. Super-heat	200 lb. 200° F. Super-heat
¾″	S	S	1½	1½	1½
1½″	S	S	1½	D.S.	D.S.
3″	S	1½	D.S.	D.S.	D.S.
6″	S	1½	D.S.	D.S.	D.S.
12″	1½	1½	2½	3	3
24″	1½	1½	2½	3½	3½
Flat	1½	2	3	3½	4

DS—Double standard thickness.

Steam at 45¢ per Million Btu.

Approximate Cost of Coal $4.70 per Ton

Size Pipe	Hot Water 175° F.	Steam 5 lbs.	Steam 200 lbs.	200 lb. 150° F. Super-heat	200 lb. 200° F. Super-heat
¾″	S	S	1½	1½	2
1½″	S	1½	D.S.	D.S.	2
3″	S	1½	D.S.	D.S.	D.S.
6″	1½	1½	D.S.	D.S.	2½
12″	1½	1½	3	3½	3½
24″	1½	2	3	3½	4
Flat	2	2½	3	4	4½

EXPLANATION—When determining the proper thickness of insulation to use, select the tables where the steam or coal cost most nearly corresponds to your steam or coal cost. Then select the column where the steam pressure most nearly corresponds to your steam pressure. The thicknesses in this column are the proper thickness for the pipe sizes given at the left of the table.

PROPERTIES OF SATURATED STEAM

The following steam tables are reprinted in part from Marks and Davis, Tables and Diagrams of the "Thermal Properties of Saturated and Superheated Steam" by permission of the publishers, Messrs. Longmans, Green & Co.

Absolute pressure in lbs. per sq. in.	Temp. in degrees F.	Heat units in liquid above 32° F.	Heat of vapori-zation (Latent Heat)	Total heat units in steam above 32° F.	Density lbs. per cu. ft.	Sp. vol. cu. ft. per lb. steam
5	162.28	130.1	1000.3	1130.5	0.01364	73.3
10	193.22	161.1	982.0	1143.1	0.02606	38.4
14.7	212.0	180.0	970.4	1150.4	0.03732	26.8
20	228.0	196.1	960.0	1156.2	0.04980	20.1
30	250.3	218.8	945.1	1163.9	0.0728	13.7
40	267.3	236.1	933.3	1169.4	0.0953	10.5
50	281.0	250.1	923.5	1173.6	0.1175	8.5
60	292.7	262.1	914.9	1177.0	0.1394	7.2
70	302.9	272.6	907.2	1179.8	0.1612	6.2
80	312.0	282.0	900.3	1182.3	0.1829	5.5
90	320.3	290.5	893.9	1184.4	0.2044	4.9
100	327.8	298.3	888.0	1186.3	0.2258	4.4
110	334.8	305.5	882.5	1188.0	0.2472	4.0
120	341.3	312.3	877.2	1189.6	0.2683	3.7
130	347.4	318.6	872.3	1191.0	0.2897	3.5
140	353.1	324.6	867.6	1192.2	0.3107	3.2
150	358.5	330.2	863.2	1193.4	0.3320	3.0
160	363.6	335.6	858.8	1194.5	0.3529	2.8
170	368.5	340.7	854.7	1195.4	0.3738	2.7
180	373.1	345.6	850.8	1196.4	0.3948	2.5
190	377.6	350.4	846.9	1197.3	0.4157	2.4
200	381.9	354.9	843.2	1198.1	0.437	2.3
225	391.5	365.0	834.8	1199.8	0.489	2.1
250	401.1	375.2	826.3	1201.5	0.541	1.9
275	409.3	384.0	818.8	1202.8	0.593	1.7
300	417.5	392.7	811.3	1204.1	0.645	1.6
325	424.7	400.5	804.6	1205.1	0.698	1.5
350	431.9	408.2	797.8	1206.1	0.750	1.3
375	438.4	415.	792.	1207.	0.81	1.3
400	444.8	422.	786.	1208.	0.86	1.2
425	450.7	429.	780.	1208.	0.91	1.1
450	456.5	435.	774.	1209.	0.96	1.0
475	461.9	442.	768.	1209.	1.02	1.0
500	467.3	448.	762.	1210.	1.08	0.9
525	472.3	454.	757.	1210.	1.14	0.9
550	477.3	459.	751.	1210	1.20	0.8
575	482.0	464.	746.	1210.	1.26	0.8
600	486.6	469.	741.	1210.	1.32	0.8
625	490.9	474.	732.	1205.	1.37	0.7
650	495.2	478.	722.	1200.	1.41	0.7
675	499.3	484.	717.	1199.	1.47	0.7
700	503.4	487.	711.	1198.	1.52	0.7

Absolute pressure = gauge pressure + 14.7.

REFERENCE TABLES
PIPE COVERING WEIGHTS

IN POUNDS PER THREE-FOOT SECTION

Kind of Covering	Thickness, in.	Pipe size, inches ½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
85% Magnesia...	Std.	1.4	1.6	1.8	2.1	2.3	3.3	3.8	4.5	5.0	5.8	6.3	7.1	8.1	10.4	11.6	13.3	14.0	20.3
85% Magnesia...	1½	3.2	3.7	4.0	4.3	4.7	5.5	6.2	7.2	7.8	8.5	9.2	10.2	11.3	12.9	14.3	16.6	17.7	20.3
85% Magnesia...	2	5.0	5.8	6.1	6.6	7.2	8.5	9.2	10.6	11.4	12.8	14.0	15.0	17.2	18.9	20.9	22.5	25.7	29.0
85% Magnesia...	Dbl. Std.	4.9	5.4	5.8	6.1	6.7	9.2	10.2	11.7	12.6	13.9	15.3	17.7	19.9	23.9	26.6	28.8	30.6	45.0
85% Magnesia...	Dbl. 1½	11.8	12.6	13.3	14.0	15.0	17.5	18.3	21.0	22.5	25.4	26.7	27.8	30.0	34.5	37.5	40.5	42.5	50.0
Careycel........	1	1.9	2.2	2.5	2.8	3.0	3.5	3.7	4.2	4.6	5.2	5.6	6.1	7.0	7.8	8.3	10.7	11.3	12.5
Carocel.........	1	2.7	3.0	3.4	3.7	4.2	4.7	5.0	6.0	6.8	7.7	8.5	9.3	10.7	11.7	12.7	15.0	17.0	20.0
Carocel.........	¾	2.0	2.2	2.5	2.7	3.1	3.5	3.7	4.5	5.1	5.7	6.3	7.0	8.0	8.8	9.5	11.3	12.8	14.1
Carocel.........	½	1.4	1.5	1.7	1.9	2.1	2.4	2.6	3.0	3.4	3.9	4.3	4.6	5.3	5.8	6.3	7.4	8.4	9.8
Multi-Ply.......	1	4.0	4.3	5.3	5.8	6.4	7.4	8.5	9.5	10.5	11.6	12.6	13.6	14.6	15.7	17.7	19.7	23.8	27.8
Asbestos Sponge..	1	4.0	4.3	5.3	5.8	6.4	7.4	8.5	9.5	10.5	11.6	12.6	13.6	14.6	15.7	17.7	19.7	23.8	27.8
Air Cell.........	1	1.4	1.5	1.7	1.8	1.9	2.4	2.6	3.0	3.2	3.4	4.2	4.9	5.3	6.1	6.9	8.2	8.6	9.6
Air Cell.........	¾	1.0	1.2	1.3	1.4	1.5	1.8	2.0	2.3	2.5	3.0	3.2	3.6	4.1	4.6	5.2	5.9	6.7	7.8
Air Cell.........	½	.8	.9	1.0	1.1	1.2	1.4	1.6	1.9	2.2	2.3	2.5	2.7	3.0	3.3	3.8	4.2	4.7	5.6
Combino........	⅝	1.7	2.0	2.2	2.5	3.0	3.7	4.5	5.2	6.0	6.7	7.5	8.2	......	......	......	......	......	......
Impervo.........	1	2.5	2.7	2.9	3.1	3.5	3.9	4.7	5.3	6.0	6.8	7.3	7.9	8.5	9.0	9.6	11.2	12.4	14.0
Impervo.........	¾	1.7	1.8	1.9	2.0	2.1	2.3	2.6	3.2	3.4	3.6	4.2	4.9	5.6	6.4	7.1	8.0	9.2	10.5
Impervo.........	½	1.0	1.1	1.2	1.4	1.6	1.9	2.3	2.6	2.9	3.2	3.6	4.2	4.8	5.5	6.4	7.2	8.5	9.7
Perfecto.........	1	1.9	2.1	2.2	2.4	2.7	3.0	3.6	4.1	4.6	5.2	5.6	6.1	6.5	6.9	7.4	8.6	9.5	10.8
Perfecto.........	¾	1.6	1.7	1.8	1.9	2.0	2.2	2.5	3.1	3.3	3.5	4.1	4.8	5.5	6.3	7.0	7.9	9.1	10.4
Perfecto.........	½	.9	1.0	1.1	1.3	1.5	1.8	2.2	2.5	2.8	3.1	3.5	4.1	4.7	5.4	6.3	7.1	8.4	9.6
Protecto.........	1	1.4	1.6	1.9	2.5	2.7	2.9	3.6	4.0	4.5	5.2	5.6	6.2	6.7	7.5	8.6	9.7	10.6	12.7
Argentum Shells	½	3.5	4.0	4.5	5.0	5.5	6.2	7.0	7.5	8.2	9.0	9.5	10.2	11.0	......	......	......	......	......
Argentum Shells For 1-in. thick covering.....	1	......	......	......	......	......	......	......	......	......	......	......	......	......	25.0	30.0	35.0	40.0	45.0

The weights given in the tables above are subject to some variation, but represent averages from which fairly accurate estimates can be made. These weights are not guaranteed.

Magnesia Covering crates measure outside 33 x 37 x 37½ in. and weigh approximately 50 lbs. each. Crates for all other coverings weigh approximately 72 lbs. each. An estimate of the weight of crated coverings can be obtained by adding 25 per cent to the weight of the coverings.

Magnesia Covering cartons measure 21¼ x 21¼ x 37 in. outside and weigh approximately 7 lbs. each. Air Cell Covering cartons measure outside 13¾ x 20¼ x 37 in. and weigh approximately 5 lbs. each. An estimated shipping weight of pipe coverings in cartons can be obtained by adding 10 per cent to the weight of the coverings.

Magnesia block cases measure 25½ x 25½ x 39¼ in. and weigh approximately 50 lbs. each. Other block cases measure 15 x 36 x 36 in. and weigh approximately 50 lbs. each.

Magnesia and Hi-Temp Blocks can be furnished in cartons measuring 12¾ x 12¾ x 37 in. outside and weighing 3 lbs. each.

Air Cell board crates measure 25½ x 36½ x 37 in. and weigh approximate 65 lbs. each.

CRATING DATA FOR PIPE COVERING AND BLOCKS

85% MAGNESIA AND HI-TEMP PIPE COVERINGS

Following table shows the number of lineal feet of 85 per cent Magnesia or Hi-Temp pipe coverings which can be packed in the standard and in the carload crates.

The standard crate used only for L. C. L. shipments has outside dimensions of 38 x 38 x 40 in. and weighs approximately 70 lbs.

The carload crate used primarily for carload shipments has outside dimensions of 33 x 37 x 37½ in. and weighs approximately 40 lbs.

Thickness	Kind of Crate	Pipe sizes, inches ½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10
Standard........	Std.	585	504	429	342	297	204	159	126	108	84	72	60	48	36	27	27	18
Standard........	CL	489	414	348	282	240	162	132	105	90	72	60	48	36	27	24	18	15
1½	CL	240	240	162	162	138	105	90	75	60	54	48	39	30	24	21	15	15
2"............	CL	138	135	105	105	90	75	60	54	48	42	36	30	27	21	18	15	12
Dbl. Standard....	CL	132	129	105	105	90	72	60	48	36	36	27	27	24	21	15	12	12
Dbl. 1½"........	CL	60	60	48	48	48	36	36	27	27	24	24	21	18	15	12	15	15

*Inner layer only, in sectional form; outer layer segmental packed in block cases.

36-ft. car holds 66 carload crates; 40-ft. car 120 carload crates; 50-ft. car 147 carload crates.

ASBESTOS AND FELT PIPE COVERINGS

Following table gives the number of lineal feet of the various types of asbestos and felt coverings of different thicknesses which can be packed in the standard crate used for these coverings, which has outside dimensions of 27½x38½x49 in., and weighs approximately 72 lbs.

Thickness, inches	Pipe sizes, inches ½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
¾.......	543	516	435	312	288	222	174	123	114	84	72	66	45	36	27	24	18	12
1.........	378	366	300	246	222	174	135	114	84	75	66	54	42	33	24	21	18	12
1½.......	222	216	174	162	135	120	84	75	54	51	45	42	27	24	21	18	15	*
2.........	135	123	120	105	90	75	54	51	45	42	36	27	24	21	18	15	*	*
3.........	60	54	51	48	45	42	36	27	24	24	21	21	18	*	*	*	*	*

*Special size crates used.

36-ft. car holds 74 crates; 40x8-ft. car 83 crates; 40x10-ft. car 102 crates; 50-ft. car 127 crates.

36-ft. car holds 373 cartons; 40-ft. car, 527 cartons; 50-ft. car, 650 cartons. Cartons measure approximately 13½x20x36¼ in.

85% MAGNESIA AND HI-TEMP BLOCKS

Size block, inches	Sq. ft. per case	No. pcs.
1 x6x36	144	96
1¼x6x36	114	76
1½x6x36	96	64
1¾x6x36	84	56
2 x6x36	72	48
2½x6x36*	60	40
3 x6x36	48	32

Cases

Inside dimensions 24½x24½x36½ in.
Outside dimensions 25½x25½x39¼ in.
Weight 50 lbs.
Gross weight per case, Magnesia Blocks—240 lbs.
Gross weight per case, Hi-Temp Blocks—385 lbs.
36-ft. car holds 120 cases blocks.
*Special case 25½x27x39¼ in.; weight, 50 lbs.

ASBESTOS BLOCKS AND SHEETS

Material	Sq. ft. per case	Gross wt., lbs.	Sq. ft. per carton	Gross wt., lbs.
2 ply Air Cell..........	432	265	108	57
3 ply Air Cell..........	288	260	72	57
4 ply Air Cell..........	216	265	54	57
1-in. thick Excel.......	216	340	54	
1-in. thick Carocel.....	216	455	54	
1-in. thick Multiply....	216	735		
1-in. thick Careycel....	216	308	54	81
1-in. thick Panelboard..	216	600		

Cases

Inside dimensions 25½x36½x37 in.
Outside dimensions 27½x38x40 in.
Weight 65 lbs.
36-ft. car holds 77 cases.
40x8-ft. car holds 96 cases.
40x10-ft. car holds 121 cases.
50-ft. car holds 153 cases.

CARTON PACKING DATA—85% MAGNESIA PRODUCTS

85% MAGNESIA PIPE COVERING STANDARD THICKNESS

NUMBER OF SECTIONS PER CARTON

Pipe size, in.	Sections per carton	Approx. weights, lbs.	
		Gross	Net
Carton Size: 13¾" x 20¼" x 37"—Weight, 5 lbs.			
½	36	60	55
¾	30	60	55
1	25	55	50
1¼	20	55	50
Carton Size: 21¼" x 21¼" x 37"—Weight, 7 lbs.			
1½	30	87	80
2	20	80	73
2½	16	76	69
3	13	68	61
3½	10	60	53
4	9	65	58
4½	7	57	50
5	6	52	45
6	5	52	45

Standard Thick Covering only supplied in cartons, in sizes up to and including 5-in. pipe size. Other thicknesses or pipe sizes are furnished in crates.

85% MAGNESIA BLOCKS

NUMBER OF SQUARE FEET PER CARTON

Block thickness, in.	Sq. ft. per carton	Approx. weights, lbs.	
		Gross	Net
1	36	52	49
1¼	28½	51	48
1½	24	53	50
1¾	21	53	50
2	18	52	49
2¼	15	51	48
2½	13½	51	48
3	12	52	49

Size of carton (outside dimension): 12¾ in. x 37 in. Weight, 3 lbs.

LOW PRESSURE PIPE COVERING CARTON PACKAGE

†Following materials only packed in cartons

Approximate Number of Three-foot Long Sections per Carton

Subject to slight variations

Pipe size, inches	½" thk.	¾" thk.	1" thk.	List prices
	Sections	Sections	Sections	Per foot
½	62	42	30	$0.22
¾	55	35	28	.24
1	45	30	23	.27
1¼	33	24	18	.30
1½	29	20	15	.33
2	20	15	12	.36
2½	15	13	11	.40
3	12	9	8	.45
3½	9	8	6	.50
x4	13*	9*	x8*	.60
5	9*	7*	6*	.70
6	7*	6*	5*	.80

xOnly 6 sections per carton for Careycel and Perfecto.
*Pipe covering sections opened and nested.
Average shipping weight approximate 50 lbs.
Cartons measure approximate 13½x20x36¼ in.
36-ft. car holds 373 cartons.
40-ft. car holds 525 cartons.
50-ft. car holds 650 cartons.

†Air Cell—Up to and including 6-in. pipe size.
Careycel—Up to and including 6-in. pipe size.
Excel—Up to and including 6-in. pipe size.
Carocel—Up to and including 6-in. pipe size.
Perfecto—1 in. thick and less up to and including 6-in. pipe size except dble. 1 in. packed in crates in sizes over 4 in.
Impervo—Same as Perfecto.
Protecto—Up to and including 6-in. pipe size.

ASBESTOS PAPER WEIGHTS AND MEASUREMENTS

Weight per 100 sq. ft.	One pound will cover	Weight of one sq. ft.	Theoretical gauge, 65 lbs. per cu. ft.	Average actual gauge	Fractional thickness	Sq. feet per 100 pounds
Pounds	Sq. feet	Pound	Inches	Inches		
6	16.66	.06	.0109	.015	..	1666
7	14.28	.07	.0127	.017	..	1428
8	12.50	.08	.0145	.019	1/64	1250
9	11.11	.09	.0163	.021	..	1111
10	10.00	.10	.0181	.022	..	1000
12	8.33	.12	.0218	.027	..	833
14	7.14	.14	.0254	.029	..	714
16	6.25	.16	.0290	.032	1/32	623
20	5.00	.20	.0363	.039	..	500
24	4.16	.24	.0435	.046	3/64	416
32	3.12	.32	.0581	.060	1/16	312
48	2.08	.48	.0872	.089	3/32	208
64	1.56	.64	.1162	.125	1/8	156

TABLE OF STANDARD DIMENSIONS
WROUGHT IRON AND STEEL STEAM, GAS AND WATER PIPE

Diameter			Nominal thickness	Circumference		Transverse area			Length pipe per square foot		Length of pipe containing 1 cu. ft.	Nominal weight per ft.
Nominal internal	Actual external	Actual internal		External	Internal	External	Internal	Metal	External surface	Internal surface		
Inches	Inches	Inches	Inches	Inches	Inches	Sq. in.	Sq. in.	Sq. in.	Feet	Feet	Feet	Pounds
⅛	.405	.269	.068	1.272	.845	.129	.057	.0717	9.431	14.199	2533.	.244
¼	.54	.364	.088	1.696	1.144	.229	.104	.1249	7.075	10.49	1383.3	.42
⅜	.675	.493	.091	2.121	1.549	.358	.191	.167	5.657	7.747	754.3	.567
½	.84	.622	.109	2.639	1.954	.554	.304	.250	4.547	6.141	473.9	.850
¾	1.05	.824	.113	3.299	2.589	.966	.533	.3327	3.637	4.635	270.	1.115
1	1.315	1.049	.133	4.131	3.296	1.358	.864	.494	2.904	3.641	166.6	1.678
1¼	1.66	1.38	.14	5.215	4.333	2.164	1.496	.668	2.301	2.768	96.25	2.244
1½	1.9	1.610	.145	5.969	5.058	2.835	2.036	.799	2.01	2.372	70.73	2.717
2	2.375	2.067	.154	7.461	6.494	4.43	3.356	1.074	1.608	1.848	42.91	3.609
2½	2.875	2.469	.203	9.032	7.757	6.492	4.788	1.704	1.328	1.547	30.07	5.793
3	3.5	3.068	.216	10.996	9.638	9.621	7.393	2.228	1.091	1.245	19.47	7.575
3½	4.0	3.548	.226	12.566	11.146	12.566	9.887	2.679	.955	1.077	14.57	9.001
4	4.5	4.026	.237	14.137	12.648	15.904	12.73	3.174	.849	.949	11.31	10.665
4½	5.0	4.506	.247	15.708	14.156	19.635	15.947	3.688	.763	.847	9.03	12.538
5	5.563	5.047	.258	17.477	15.856	24.306	20.006	4.300	.686	.756	7.198	14.671
6	6.625	6.065	.28	20.813	19.054	34.472	28.888	5.584	.577	.63	4.98	18.762
7	7.625	7.023	.301	23.955	22.063	45.664	38.738	6.926	.501	.544	3.72	23.271
8	8.625	7.981	.322	27.096	25.073	58.426	50.027	8.399	.442	.478	2.878	28.544
9	9.625	8.941	.342	30.238	28.089	72.76	62.786	9.974	.396	.427	2.294	33.907
10	10.75	10.020	.365	33.772	31.479	90.763	78.855	11.908	.355	.381	1.826	40.483
11	11.75	11.	....	36.914	34.558	108.434	95.033	13.401	.325	.347	1.51	45.028
12	12.75	12.	....	40.055	37.7	127.677	113.098	14.579	.299	.319	1.27	48.985
	14.0	13.25	.375	43.982	41.626	153.938	137.887		.273	.288		
	16.0	15.25	.375	50.266	47.909	201.062	182.655		.239	.250		
	18.0	17.25	.375	56.549	54.193	254.470	239.706		.212	.221		
	20.0	19.25	.375	62.832	60.476	314.159	291.040		.191	.198		
	22.0	21.25	.375	69.115	66.759	380.134	354.657		.174	.180		
	24.0	23.25	.375	75.398	73.042	452.390	424.558		.159	.164		

CAREY ROCK WOOL BLANKETS

TYPES OF BLANKETS

Style No. 200—1-in. galvanized wire mesh both sides.
For flexibility—no plaster base.

Style No. 201—1-in. galvanized wire mesh one side—expanded metal lath other side.
For flexibility and plaster base one side.

Style No. 202—Metal lath both sides.
For flexibility and plaster base both sides.

Style No. 203—⅜-in. rib lath (rib in) one side—1-in. galvanized wire mesh other side.
Rigid one side and plaster base one side.

Style No. 203A—⅜-in. rib lath (rib out) one side—1-in. galvanized wire mesh other side.
Rigid one side and furnishes a ⅜-in. air space—no plaster base.

Style No. 204—⅜-in. rib lath (rib in) one side—metal lath other side.
Rigid one side and plaster base both sides.

Style No. 204A—⅜-in. rib lath (rib out) one side—metal lath other side.
Rigid one side with ⅜-in. air space and plaster base one side.

Style No. 205—¾-in. rib lath (rib in) one side—1-in. galvanized wire mesh other side.
Rigid one side and plaster base one side.

Style No. 205A—¾-in. rib lath (rib out) one side—1-in. galvanized wire mesh other side.
Rigid one side and furnishes a ¾-in. air space—no plaster base.

Style No. 206—¾-in. rib lath (rib in) one side—metal lath other side.
Rigid one side and plaster base both sides.

Style No. 206A—¾-in. rib lath (rib out) one side—metal lath other side.
Rigid one side with ¾-in. air space and plaster base one side.

Style No. 208—⅜-in. rib lath (rib in) both sides.
Rigid both sides and plaster base both sides.

Style No. 209—⅜-in. rib lath (rib out) one side—⅜-in. rib lath (rib in) other side.
Rigid both sides and furnishes ⅜-in. air space one side and plaster base other side.

Style No. 210—Screen wire both sides.
For special flexibility.

LIST PRICES PER SQUARE FOOT

The Bold figures immediately below the list prices indicate the approximate shipping weight per square foot

Style	1" Thick	1½" Thick	2" Thick	2½" Thick	3" Thick	3½" Thick	4" Thick	5" Thick	6" Thick
200	$0.40 **1.65**	$0.50 **2.30**	$0.60 **2.95**	$0.70 **3.65**	$0.80 **4.35**	$0.88 **5.00**	$0.95 **5.65**	$1.10 **7.05**	$1.25 **8.45**
201	.45 **1.80**	.60 **2.45**	.70 **3.10**	.80 **3.80**	.90 **4.50**	.98 **5.15**	1.05 **5.80**	1.20 **7.20**	1.35 **8.60**
202	.55 **1.90**	.65 **2.55**	.75 **3.20**	.85 **3.90**	.95 **4.60**	1.03 **5.25**	1.10 **5.90**	1.25 **7.30**	1.40 **8.70**
203	.60 **2.00**	.70 **2.65**	.80 **3.30**	.90 **4.00**	1.00 **4.70**	1.08 **5.35**	1.15 **6.00**	1.30 **7.40**	1.45 **8.80**
203A	.60 **2.00**	.70 **2.65**	.80 **3.30**	.90 **4.00**	1.00 **4.70**	1.08 **5.35**	1.15 **6.00**	1.30 **7.40**	1.45 **8.80**
204	.60 **2.15**	.70 **2.80**	.80 **3.45**	.90 **4.15**	1.00 **4.85**	1.08 **5.50**	1.15 **6.15**	1.30 **7.55**	1.45 **8.95**
204A	.60 **2.15**	.70 **2.80**	.80 **3.45**	.90 **4.15**	1.00 **4.85**	1.08 **5.50**	1.15 **6.15**	1.30 **7.55**	1.45 **8.95**
205	.70 **2.25**	.80 **2.90**	.90 **3.55**	1.00 **4.25**	1.10 **4.95**	1.18 **5.60**	1.25 **6.25**	1.45 **7.65**	1.65 **9.05**
205A	.70 **2.25**	.80 **2.90**	.90 **3.55**	1.00 **4.25**	1.10 **4.95**	1.18 **5.60**	1.25 **6.25**	1.45 **7.65**	1.65 **9.05**
206	.75 **2.40**	.90 **3.00**	1.00 **3.65**	1.10 **4.35**	1.20 **5.05**	1.28 **5.80**	1.35 **6.35**	1.55 **7.75**	1.75 **9.15**
206A	.75 **2.40**	.90 **3.00**	1.00 **3.65**	1.10 **4.35**	1.20 **5.05**	1.28 **5.80**	1.35 **6.35**	1.55 **7.75**	1.75 **9.15**
208	.75 **2.40**	.90 **3.05**	1.00 **3.70**	1.10 **4.40**	1.20 **5.10**	1.28 **5.75**	1.35 **6.40**	1.55 **7.80**	1.75 **10.00**
209	.75 **2.40**	.90 **3.05**	1.00 **3.70**	1.10 **4.40**	1.20 **5.10**	1.28 **5.75**	1.35 **6.40**	1.55 **7.80**	1.75 **10.00**
210	.60 **1.65**	.70 **2.30**	.80 **2.95**	.90 **3.65**	1.00 **4.35**	1.08 **5.00**	1.15 **5.65**	1.30 **7.05**	1.45 **8.45**

Above prices are for crated Carey Rock Wool Blankets in standard size sheets, 2x4 ft. or 2x8 ft.

AREAS—FITTINGS AND FLANGES

The following table shows the approximate areas of insulating blocks and cement required to cover flanged fittings and flanges:

Flanged Fittings			Flanges		
Pipe size, inches	Average sq. ft. area of metal surface	Sq. ft. cement, used solid	Pipe size, inches	Sq. ft. blocks	Sq. ft. cement, ½-in. thk. over 1½-in. blocks
2½	0.7	1.0	2½	1.0	2.4
3	0.9	1.3	3	1.2	2.6
3½	1.0	1.5	3½	1.4	2.7
4	1.2	1.7	4	1.6	2.9
4½	1.5	1.9	4½	1.7	3.0
5	1.7	2.1	5	1.8	3.3
6	2.2	2.6	6	2.1	3.5
7	2.7	3.3	7	2.4	4.0
8	3.3	3.5	8	2.7	4.5
9	4.0	4.5	9	3.1	4.8
10	4.5	5.0	10	3.7	5.0
12	6.3	6.8	12	4.4	6.7
14	8.3	9.0	14	4.8	7.0
16	9.7	10.5	16	6.0	9.0
18	12.0	13.0	18	6.8	10.0
20	14.5	15.5	20	7.7	11.0
22	17.3	18.5	22	8.7	12.2
24	21.0	22.3	24	10.0	13.4
26	24.0	25.0	26	11.0	14.7
28	27.0	28.5	28	13.0	16.0
30	30.0	31.0	30	14.5	18.0

Use metal area to secure area of blocks.

For area of ½-in. cement over 1-in. block use 133⅓% of metal area.

For area of ½-in. cement over 1½-in. block use 140% of metal area.

For area of ½-in. cement over 2-in. block use 150% of metal area.

The second column under fittings indicates the square-foot area of blocks required to cover them while the third column shows the square-foot area of cement used solid.

The second column under flanges indicates the square-foot area of block insulation required to cover them, while the third column shows the square-foot area of cement ½ in. thick used over 1½-in. thick blocks.

ASBESTOS CEMENT FOR STANDARD FITTINGS

Nominal pipe size, inches	Pounds asbestos cement			
	90° Ells	Valves and tees	Crosses	One pair flanges
½, ¾, and 1	2.0	2.5	2.7	4.5
1¼, 1½, and 2	3.5	4.3	4.7	6.1
2½ and 3	6.0	7.5	8.0	8.9
3½ and 4	9.0	12.3	12.0	13.1
4½ and 5	12.5	15.6	16.7	14.1
6	15.0	18.8	20.0	16.4
7	18.5	23.1	24.3	19.0
8	19.5	24.2	26.0	22.0
9	24.0	30.0	32.0	26.0
10	29.0	36.1	38.9	27.5
12	37.5	47.0	50.0	38.0

This table gives the approximate number of pounds of asbestos cement which will cover standard screwed fittings and flanges 1 in. thick. It is based upon asbestos cement having a covering capacity of 15 sq. ft. 1 in. thick per 100-lb. bag.

If 85% Magnesia cement is used, one-fourth the amount will be required.

Where fittings are covered flush with adjacent 1-in. thick pipe covering only approximately ½-in. thickness is required and consequently one-half the amount specified in this table.

For flanged fittings figure the amount required for screwed fittings and in addition the amount required for the number of sets of flanges on each flanged fitting.

Where sleeves of sectional covering or blocks are used around the outer surface of flanges only one-third the amount of cement specified in the table will be needed for filling cracks and filling in space between such sleeve and the outer surface of 1-in. thick pipe covering.

For 45-degree ells approximately one-half the amount specified for 90-degree ells will be required.

For long radius ells approximately two times the amount specified for 90-degree ells will be required.

LOSSES FROM HORIZONTAL BARE STEEL STEAM PIPES

From 100 Lineal Feet of Pipe per Month of 30 Days With Steam in Pipes 24 Hours per Day. Coal at $4.00 per Ton of 2,000 Lbs.

Steam press.	Hot Water			10 lbs.			80 lbs.			120 lbs.			160 lbs.			200 lbs.			200 lbs. and 100° F. Superheat			275 lbs. and 250° F. Superheat		
Temp.	180° F.			239.4° F.			324.0° F.			350.0° F.			370.7° F.			387.9° F.			487.9° F.			664.3° F.		
Pipe size, in.	Dollars Loss	Lbs. Coal	B.t.u. per Lin. Ft. per °F. Diff. per hr.	Dollars Loss	Lbs. Coal	B.t.u. per Lin. Ft. per °F. Diff. per hr.	Dollars Loss	Lbs. Coal	B.t.u. per Lin. Ft. per °F. Diff. per hr.	Dollars Loss	Lbs. Coal	B.t.u. per Lin. Ft. per °F. Diff. per hr.	Dollars Loss	Lbs. Coal	B.t.u. per Lin. Ft. per °F. Diff. per hr.	Dollars Loss	Lbs. Coal	B.t.u. per Lin. Ft. per °F. Diff. per hr.	Dollars Loss	Lbs. Coal	B.t.u. per Lin. Ft. per °F. Diff. per hr.	Dollars Loss	Lbs. Coal	B.t.u. per Lin. Ft. per °F. Diff. per hr.
½	1.09	435	.550	1.95	778	.617	3.55	1420	.736	4.14	1658	.776	4.63	1852	.805	5.09	2034	.835	8.00	3200	.992	15.37	6150	1.33
1	1.62	648	.819	2.93	1172	.929	5.34	2136	1.11	6.25	2500	1.17	7.01	2805	1.22	7.67	3070	1.26	12.20	4890	1.52	23.51	9410	2.04
1½	2.27	910	1.15	4.11	1651	1.31	7.62	3050	1.58	8.78	3515	1.65	9.87	3950	1.72	10.80	4320	1.77	17.20	6900	2.14	33.45	13380	2.89
2	2.79	1115	1.41	5.02	2005	1.59	9.21	3690	1.91	10.79	4320	2.02	12.14	4850	2.11	13.30	5310	2.18	21.25	8520	2.64	41.35	16550	3.58
2½	3.32	1328	1.68	6.03	2407	1.91	11.05	4420	2.29	12.90	5170	2.42	14.50	5770	2.52	15.90	6360	2.61	25.50	10200	3.16	49.60	19830	4.29
3	4.00	1597	2.02	7.25	2900	2.30	13.26	5310	2.75	15.48	6200	2.90	17.50	6950	3.04	19.10	7630	3.13	30.70	12300	3.81	59.90	23950	5.18
3½	4.51	1803	2.28	8.16	3265	2.59	15.00	6010	3.11	17.50	7010	3.28	19.67	7870	3.42	21.70	8670	3.56	34.70	13870	4.30	68.30	27300	5.91
4	5.04	2016	2.55	9.11	3644	2.89	16.80	6720	3.48	19.57	7840	3.67	22.05	8810	3.83	24.10	9640	3.96	38.90	15580	4.83	75.80	30330	6.56
4½	5.54	2215	2.80	10.00	4010	3.18	18.41	7380	3.82	21.55	8630	4.04	24.30	9700	4.22	26.75	10700	4.39	42.80	17170	5.32	84.00	33600	7.27
5	6.02	2444	3.09	11.10	4436	3.52	20.40	8170	4.23	23.90	9570	4.48	26.90	10760	4.68	29.65	11860	4.87	47.40	18970	5.88	93.00	37200	8.05
6	7.22	2885	3.65	13.20	5280	4.19	24.10	9650	5.00	28.35	11350	5.31	31.70	12700	5.52	34.90	13950	5.73	56.10	22460	6.96	110.40	44100	9.55
7	8.23	3290	4.16	15.00	6000	4.76	27.50	11000	5.70	32.12	12850	6.02	36.30	14500	6.30	39.80	15920	6.54	64.10	25680	7.96	125.80	50300	10.88
8	9.16	3685	4.66	16.76	6710	5.32	31.10	12450	6.45	36.30	14520	6.80	40.70	16280	7.08	44.70	17850	7.33	72.00	28830	8.93	142.10	57850	12.30
9	10.18	4073	5.15	18.52	7410	5.88	34.10	13650	7.07	40.00	16020	7.50	45.00	18000	7.83	49.55	19820	8.14	79.80	32000	9.92	158.50	63400	13.71
10	11.30	4524	5.72	20.60	8240	6.54	37.95	15200	7.87	44.40	17750	8.31	50.10	20030	8.71	55.00	21960	9.02	87.60	35200	10.86	175.00	70000	15.15
12	13.28	5310	6.72	24.23	9700	7.69	44.64	17870	9.26	52.30	20940	9.80	58.80	23550	10.24	64.80	25900	10.63	104.00	41600	12.90	206.90	82700	17.90
14	14.40	5770	7.29	26.30	10530	8.35	48.25	79450	10.07	57.10	22860	10.70	64.00	25620	11.14	70.50	28200	11.58	113.50	45500	14.10	225.40	90100	19.50
16	16.28	6520	8.24	29.70	11900	9.43	54.90	22000	11.40	64.80	25900	12.13	72.60	29050	12.63	80.00	32000	13.13	129.30	51800	16.05	256.50	102700	22.20
18	18.28	7320	9.25	33.10	13250	10.50	61.70	24700	12.80	72.20	28900	13.53	81.30	32540	14.15	89.60	35830	14.71	144.60	58000	17.96	289.30	115400	24.95

In these tables coal has been figured at $4.00 per ton of 2,000 lbs.—13,000 B.t.u. per pound of coal—labor, boiler room expense, etc., taken at $1.00 per ton, making total value of coal fired at $5.00 per ton. Boiler efficiency taken at 70 per cent. Air temperature 80° F. Experimental data obtained at the Mellon Institute.

EFFICIENCIES OF PIPE COVERINGS

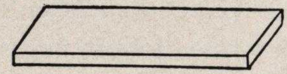
The term "efficiency" as used in connection with pipe covering means the per cent of reduction of heat loss from bare pipes by the use of pipe covering; i.e., the saving expressed in per cent of bare pipe loss. Example: A given length of bare steam piping loses the equivalent of 100 lbs. of coal per hour. A pipe covering having an efficiency of 85 per cent and used over this pipe would save 85 lbs. of coal per hour.

Steam Pressure...........			Hot Water		10 lbs.		80 lbs.		120 lbs.		160 lbs.		200 lbs.		200 lbs. and 100° F. Superheat		275 lbs. and 250° F. Superheat	
Steam Temperature °F..... Temperature Difference °F..			180° F. 100° F.		239.4° F. 159.4° F.		324.0° F. 244.0° F.		350.0° F. 270.0° F.		370.7° F. 290.7° F.		387.9° F. 307.9° F.		487.9° F. 407.9° F.		664.3° F. 584.3° F.	
Insulation material	Thickness, in.	Pipe Size In.	% Eff.	Loss	% Eff.	Loss	% Eff.	Loss	% Eff.	Loss	% Eff.	Loss	% Eff.	Loss	% Eff.	Loss	% Eff.	Loss
85% Magnesia	Std.	3	79.9	40.7	81.7	67.3	83.8	108.5	84.4	122.0	84.9	133.0	85.3	142.3	87.1	200.0	89.7	314.0
		6	82.4	64.3	84.1	105.7	86.1	169.5	86.7	190.4	87.1	207.5	87.3	222.0	89.1	308.8	91.3	482.0
		12	86.5	90.3	87.9	148.7	89.4	239.0	89.8	268.2	90.1	291.7	90.5	311.0	91.6	437.0	93.9	634.0
	1½	3	84.1	32.0	85.6	52.6	87.3	84.7	87.9	94.8	88.3	103.2	88.6	110.5	90.0	153.7	92.1	239.6
		6	85.7	52.3	87.1	86.0	88.7	137.6	89.2	154.5	89.5	168.1	89.8	179.2	91.2	249.5	93.1	387.0
		12	86.7	89.1	87.9	147.8	89.4	239.0	89.8	268.5	90.1	293.5	90.4	313.5	91.7	438.0	93.5	687.0
	2	3	86.9	26.5	88.1	43.7	89.6	69.8	90.1	78.6	90.3	85.8	90.5	91.4	91.9	125.5	93.6	196.4
		6	88.5	41.6	89.7	68.6	91.0	109.8	91.3	123.1	91.7	134.0	91.9	143.2	92.9	198.6	94.5	307.0
		12	89.1	73.0	90.5	116.4	91.5	192.5	91.9	216.0	92.2	235.2	92.3	251.0	93.3	350.0	94.8	543.0
	3	3	89.5	21.1	90.5	34.7	91.7	55.6	92.1	62.4	92.3	68.0	92.5	72.7	93.4	86.0	94.9	156.6
		6	91.1	32.5	92.0	53.4	92.9	85.4	93.3	95.8	93.5	104.0	93.7	111.0	94.5	153.7	95.7	235.0
		12	92.0	53.5	92.8	88.1	93.7	141.3	94.0	158.2	94.2	172.5	94.3	184.0	95.2	256.0	96.1	398.0
Multi-Ply and Asbestos-Sponge	1	3	82.7	34.8	83.9	59.0	85.5	97.5	85.9	110.7	86.3	121.3	86.5	130.2	88.0	186.4	90.1	303.0
		6	84.2	57.5	85.4	97.5	86.7	162.0	87.1	183.5	87.3	203.0	87.7	216.4	89.0	311.5	90.8	510.0
		12	84.8	102.0	85.9	172.8	87.3	287.0	87.7	325.0	87.9	357.4	88.3	384.0	89.5	553.0	91.3	904.0
	1½	3	86.9	26.5	87.8	44.6	88.7	73.7	89.3	83.7	89.6	91.6	89.8	98.2	90.9	140.7	92.5	228.0
		6	88.1	43.2	89.1	72.7	90.1	119.8	90.5	135.5	90.7	148.6	90.9	159.5	91.9	227.5	93.4	368.0
		12	88.9	74.5	89.7	126.0	90.8	208.5	91.1	236.4	91.3	259.0	91.5	278.0	92.4	400.0	93.7	652.0
	2	3	89.1	22.0	88.8	37.1	90.9	61.0	91.2	68.9	91.4	75.6	91.6	81.0	92.5	115.8	93.9	187.0
		6	90.6	34.2	91.3	57.7	92.1	95.2	92.5	107.5	92.7	117.8	92.8	126.5	93.6	181.0	94.7	291.7
		12	91.0	60.1	91.9	101.2	92.5	167.0	92.9	189.0	93.0	207.3	93.1	222.5	93.9	318.5	95.0	515.0
	3	3	91.3	17.5	91.9	29.5	92.7	48.6	93.0	54.6	93.3	59.6	93.4	64.0	94.1	91.7	95.1	147.2
		6	92.6	26.9	93.1	45.3	93.9	74.4	94.1	84.0	94.3	92.2	94.4	98.8	95.0	140.8	96.0	224.3
		12	93.4	44.4	93.9	74.6	94.6	122.7	94.7	138.8	94.9	152.0	95.0	163.2	95.5	233.6	96.3	377.0
Air Cell	½	3	59.4	82.0	61.1	142.3	63.8	243.0	64.5	278.0	......	......	......	......	......	......	......	......
		6	61.0	142.4	63.0	247.0	65.4	422.0	66.4	482.0	......	......	......	......	......	......	......	......
		12	62.0	255.0	63.7	445.0	66.2	763.0	66.9	875.0	......	......	......	......	......	......	......	......
	¾	3	68.5	63.5	70.3	109.0	72.7	183.5	73.3	209.0	......	......	......	......	......	......	......	......
		6	70.0	109.5	71.9	188.0	74.0	317.0	74.8	361.0	......	......	......	......	......	......	......	......
		12	71.9	190.0	73.2	329.0	75.2	560.0	75.9	639.0	......	......	......	......	......	......	......	......
	1	3	73.7	53.0	75.3	90.5	77.3	152.0	77.9	172.8	......	......	......	......	......	......	......	......
		6	75.9	88.0	77.4	150.6	79.2	253.5	79.8	288.5	......	......	......	......	......	......	......	......
		12	76.9	155.0	78.3	266.0	80.1	450.0	80.6	513.0	......	......	......	......	......	......	......	......

The columns headed "loss" give the loss in B.t.u. per lineal foot of pipe at the temperature difference indicated, per hour. All data from tests conducted at Mellon Institute of Industrial Research.

STANDARD AREA TABLES for Blocks and Lagging

FLAT



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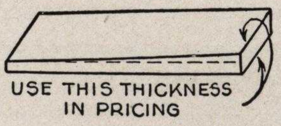
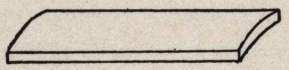


CURVED



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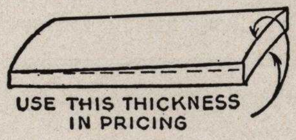

Flat blocks		Curved blocks—over 16½-in. radius*				
Thickness		Less than 1½ in.		1½ in. to 2 in. inclusive		Over 2 in.
Length block, in.	Area block, sq. ft.	Area block, sq. ft.	Length block, in.	Area block, sq. ft.	Length block, in.	Area block, sq. ft.
1/32	.002	.002	1/32	.002	1/32	.002
1/16	.002	.002	1/16	.002	1/16	.002
⅛	.006	.006	⅛	.006	⅛	.006
¼	.010	.010	¼	.012	¼	.012
⅜	.016	.016	⅜	.016	⅜	.016
½	.020	.022	½	.022	½	.022
⅝	.026	.028	⅝	.028	⅝	.028
¾	.032	.032	¾	.034	¾	.034
⅞	.036	.038	⅞	.038	⅞	.040
1	.042	.044	1	.044	1	.044
2	.084	.088	2	.088	2	.090
3	.126	.132	3	.132	3	.134
4	.166	.176	4	.178	4	.178
5	.208	.220	5	.222	5	.224
6	.250	.264	6	.266	6	.268
7	.292	.306	7	.310	7	.312
8	.334	.350	8	.354	8	.358
9	.376	.394	9	.398	9	.402
10	.416	.438	10	.442	10	.448
11	.458	.482	11	.486	11	.492
12	.500	.526	12	.532	12	.536
13	.542	.570	13	.576	13	.582
14	.584	.614	14	.620	14	.626
15	.626	.658	15	.664	15	.670
16	.666	.702	16	.708	16	.716
17	.708	.746	17	.752	17	.760
18	.750	.790	18	.796	18	.804
19	.792	.832	19	.842	19	.850
20	.834	.876	20	.886	20	.894
21	.876	.920	21	.930	21	.938
22	.916	.964	22	.974	22	.984
23	.958	1.008	23	1.018	23	1.028
24	1.000	1.052	24	1.062	24	1.072
25	1.042	1.096	25	1.106	25	1.118
26	1.084	1.140	26	1.152	26	1.162
27	1.126	1.184	27	1.196	27	1.208
28	1.166	1.228	28	1.240	28	1.252
29	1.208	1.272	29	1.284	29	1.296
30	1.250	1.316	30	1.328	30	1.342
31	1.292	1.358	31	1.372	31	1.386
32	1.334	1.402	32	1.416	32	1.430
33	1.376	1.446	33	1.460	33	1.476
34	1.416	1.490	34	1.506	34	1.520
35	1.458	1.534	35	1.550	35	1.564
36	1.500	1.578	36	1.594	36	1.610
37	1.542	1.622	37	1.638	37	1.654
38	1.584	1.666	38	1.682	38	1.698
39	1.626	1.710	39	1.726	39	1.744
40	1.666	1.754	40	1.770	40	1.788
41	1.708	1.798	41	1.815	41	1.832
42	1.750	1.842	42	1.860	42	1.877

Areas for Flat, Curved and Tapered Blocks 6 in. wide.
For 3-in. wide blocks multiply area shown by 0.5.
For 9-in. wide blocks multiply area shown by 1.5.
For 12-in. wide blocks multiply area shown by 2.0.
Retain *all* decimals in all cases.
*All blocks curved to a radius *less* than 16½ in. are figured on segmental Pipe Covering basis.

HI-TEMP COMBINATION PIPE COVERING

Carey Hi-Temp Pipe Coverings are regularly furnished in thicknesses shown in following table. Special thicknesses are made to order. Sizes ½ in. to 1½ in. inclusive should be used without any outerlayer, and are then supplied with canvas jacket and bands for applying. All larger pipe sizes are intended to be used as inner layers only in combination with other outer layer coverings, and no canvas or bands are supplied except on special order.

Pipe Size	1½″ Nominal Thickness			2″ Nominal Thickness			2½″ Nominal Thickness			3″ Nominal Thickness		
Inches	Actual thickness	List price	Outer layer pipe size	Actual thickness	List price	Outer layer pipe size	Actual thickness	List price	Outer layer pipe size	Actual thickness	List price	Outer layer pipe size
½	1½	$0.46	3	2	$0.75	4½	....	....	....	....	....	....
¾	1½	.49	3½	2	.80	4½	....	....	....	....	....	....
1	1½	.52	4	2	.85	5	....	....	....	....	....	....
1¼	1½	.56	4	2	.90	5	....	....	....	....	....	....
1½	1½	.60	4½	2	.95	6	....	....	....	....	....	....
2	1¼	.64	4½	$2\frac{1}{16}$	1.00	6	....	....	....	....	....	....
2½	$1\frac{5}{16}$	.70	5	$1\frac{13}{16}$	1.05	6	....	....	....	....	....	....
3	$1\frac{9}{16}$	.76	6	$2\frac{1}{16}$	1.15	7	$2\frac{9}{16}$	$1.50	8	....	....	....
3½	$1\frac{5}{16}$	.82	6	$1\frac{13}{16}$	1.25	7	$2\frac{7}{16}$	1.65	8	....	....	....
4	$1\frac{9}{16}$	.88	7	$2\frac{1}{16}$	1.35	8	2½	1.80	9	....	....	....
4½	$1\frac{5}{16}$	.94	7	$1\frac{13}{16}$	1.45	8	2½	1.95	9	....	....	....
5	1½	1.00	8	2	1.55	9	2½	2.10	10	3‡	$2.50	11*
6	1½	1.10	9	$2\frac{1}{16}$	1.70	10	2½	2.25	11*	3‡	2.70	12†*
7	1½	1.20	10	2	1.85	11*	2½	2.40	12†*	3‡	2.90	14†
8	1½	1.35	11*	2	2.00	12†*	2½	2.55	14†	3‡	3.15	15†
9	1½	1.50	12†*	2⅛	2.20	14†	2½	2.80	15†	3‡	3.40	16†
10	$1\frac{9}{16}$	1.65	14†	2⅛	2.40	15†	2½	3.05	16†	3†	3.65	17†
12	$1\frac{9}{16}$†	1.85	16†	2⅛†	2.70	17†	2½†	3.40	18†	3†	4.10	19†
14	1½†	2.10	17†	2†	3.00	18†	2½†	3.80	19†	3†	4.60	20†
16	1½†	2.35	19†	2†	3.30	20†	2½†	4.20	21†	3†	5.10	22†
18	1½†	2.60	21†	2†	3.60	22†	2½†	4.60	23†	3†	5.60	24†
20	1½†	2.85	23†	2†	4.00	24†	2½†	5.00	26†	3†	6.00	26†
24	1½†	3.30	27†	2†	4.50	28†	2½†	5.75	30†	3†	7.00	30†
30	1½†	4.00	33†	2†	5.50	**	2½†	6.95	**	3†	8.40	**
33	1½†	4.40	**	2†	6.05	**	2½†	7.60	**	3†	9.20	**

No outer layers included in price.

*Special sectional outer layer furnished in 85% Magnesia in 1½-in. and 2-in. thickness; 2½-in. and 3-in. thickness furnished in curved blocks.

†Hi-Temp and 85% Magnesia furnished in the form of curved blocks. Outer layer coverings made of asbestos paper furnished in 3-ft. long semi-cylindrical sections for all pipe size. For pricing, use PIPE COVERING list prices.

**Sizes over 33 in. diameter are curved blocks. For pricing use BLOCK list prices and Standard Area Table.

‡Furnished in the form of Dbl. layer Sectional Pipe Covering.

FREIGHT TABLES

The following table shows the approximate freight cost for various coverings in per cent of list price, based on $1.00 per cwt. freight rate.

	Bulk	Crated		Bulk	Crated
85% Magnesia Blocks	....	6.0%	Hi-Temp No. 15 or No. 19 Blocks	....	8.5%
85% Magnesia Cement	8.0%	....	Hi-Temp No. 15 or No. 19 Pipe Covering	....	7.5%
85% Magnesia Covering	....	5.0%	Impervo Covering (½″ th.)	2.6%	3.3%
Air Cell Covering (2-ply)	1.5%	1.9%	Impervo Covering (¾″ th.)	3.7%	4.6%
Air Cell Covering (3-ply)	2.2%	2.8%	Impervo Covering (1″ th.)	5.0%	6.3%
Air Cell Covering (4-ply)	2.8%	3.5%	Multi-Ply Covering (1″ th.)	7.0%	8.5%
Hi-Temp No. 19 Blocks	....	10.0%	Perfecto Covering (½″ th.)	2.4%	3.0%
Argentum Covering	6.25%	7.8%	Perfecto Covering (¾″ th.)	3.4%	4.3%
Argentum Sh. ½″ to 6″	9.0%	10.0%	Perfecto Covering (1″ th.)	4.7%	5.9%
Argentum Sh. 7″ to 12″	14.0%	15.0%	Protecto Covering (1″ th.)	4.0%	5.0%
Carocel Covering (½″ th.)	2.2%	2.9%			
Carocel Covering (¾″ th.)	4.0%	5.0%			
Carocel Covering (1″ th.)	5.0%	6.0%			
Combino Train Pipe Covering	4.5%	5.6%			

To obtain approximate freight in per cent of list price for any rate of freight multiply the percentage given above by the freight rate in dollars: For example, to determine the freight cost of Magnesia covering when the freight rate is 35¢ per cwt.: 5.0% x $0.35 = 1.75% of the list price.

LIST PRICES for Pipe Covering

The following list prices apply to all Carey pipe coverings of corresponding thickness,† except that Standard list prices apply to all pipe coverings of 1 in. or less thickness.

Note: All pipe coverings, blocks and sheets while quoted in terms of following List Prices less discount are actually priced at net unit prices appearing in "Manual of Unit Prices" published by the magazine "Asbestos," which are essentially the same as list prices less quoted discount.

Nominal pipe size	**Standard	1½ inch thickness	2 inch thickness	Double standard thickness	2½ inch thickness	3 inch thickness (double layer)	Standard thickness 85% magnesia covering	Double standard thickness 85% magnesia covering	
	Price per lineal foot	Price per lineal foot	Price per lineal foot	Price per lineal foot	Price per lineal foot	Price per lineal foot		Inner layer	Outer layer
	A	B	C	D	E	F			
Inches							Inches	Inches	Inches
½	$0.22	$0.46	$0.75	$0.65	$1.00	$1.20	⅞	⅞	1 1/32
¾	.24	.49	.80	.70	1.05	1.35	⅞	⅞	1 1/32
1	.27	.52	.85	.75	1.10	1.40	⅞	⅞	1 1/32
1¼	.30	.56	.90	.80	1.15	1.45	⅞	⅞	1 1/32
1½	.33	.60	.95	.85	1.20	1.55	⅞	⅞	1 1/32
2	.36	.64	1.00	.90	1.25	1.65	1 1/32	1 1/32	1⅛
2½	.40	.70	1.05	1.00	1.35	1.75	1 1/32	1 1/32	1⅛
3	.45	.76	1.15	1.10	1.50	1.90	1 1/32	1 1/32	1⅛
3½	.50	.82	1.25	1.20	1.65	2.05	1 1/32	1 1/32	1⅛
4	.60	.88	1.35	1.40	1.80	2.20	1⅛	1⅛	1⅛
4½	.65	.94	1.45	1.50	1.95	2.35	1⅛	1⅛	1⅛
5	.70	1.00	1.55	1.60	2.10	2.50	1⅛	1⅛	1¼
6	.80	1.10	1.70	1.80	2.25	2.70	1⅛	1⅛	1¼
7	1.00	1.20	1.85	2.25	2.40	2.90	1¼	1¼	1¼
8	1.10	1.35	2.00	2.50	2.55	3.15	1¼	1¼	1¼
9	1.20	1.50	2.20	2.70	2.80	3.40	1¼	1¼	1¼
10	1.30	1.65	2.40	2.90	3.05	3.65	1¼	1¼	1¼
*12	1.85	1.85	2.70	4.10	3.40	4.10	1½	1½	1½
14	2.10	2.10	3.00	4.60	3.80	4.60	1½	1½	1½
16	2.35	2.35	3.30	5.10	4.20	5.10	1½	1½	1½
18	2.60	2.60	3.60	5.60	4.60	5.60	1½	1½	1½
20	2.85	2.85	4.00	6.00	5.00	6.00	1½	1½	1½
24	3.30	3.30	4.50	7.00	5.75	7.00	1½	1½	1½
30	4.00	4.00	5.50	8.40	6.95	8.40	1½	1½	1½

*Standard thickness, 1½-in. thickness, 2-in. thickness and 2½-in. thickness 85% Magnesia Coverings, and Hi-Temp Coverings are furnished in sections for pipe sizes up to and including 10 in. For larger pipe sizes curved blocks are furnished. All other pipe coverings are furnished in sectional form for all pipe sizes except Careycel, which is not made larger than 16-in. pipe size.

Double standard thickness and double 1½-in. thickness 85% Magnesia Coverings—the inner layer is furnished in sections for pipe sizes up to and including 10 in., and in curved blocks for larger sizes. The outer layer is furnished in sections for pipe sizes up to and including 8 in., and in curved blocks for larger sizes. All other double layer coverings are furnished in sectional form for all pipe sizes, except Careycel, which is not made larger than 16-in. pipe size.

Sections and Segments (curved block) are 36 in. in length.

**Standard list is always used for pipe coverings 1 in. thick or less.

†Exception: Hi-Temp Pipe Coverings will be priced as follows:

1 9/16 in. thick or less	as 1½ in. thick	2 9/64 in. to 2 37/64 in. thick inclusive	as 2½ in. thick
1 37/64 in. to 2⅛ in. thick inclusive	as 2 in. thick	2 19/32 in. to 3 5/64 in. thick inclusive	as 3 in. thick

LIST PRICES for Sheets and Blocks

Thickness, in.	Price square foot	Thickness, in.	Price square foot	Thickness, in.	Price square foot	Thickness, in.	Price square foot
¾	$0.27	1½	$0.45	2⅛	$0.64	2¾	$0.83
⅞	.27	1⅝	.49	2¼	.68	2⅞	.87
1	.30	1¾	.53	2⅜	.72	3	.90
1⅛	.34	1⅞	.57	2½	.75	3¼	.98
1¼	.38	2	.60	2⅝	.79	3½	1.05
1⅜	.42					4	1.20

DISTRIBUTING POINTS

Akron, Ohio	The Philip Carey Mfg. Company	E. Thornton and High Streets
Atlanta, Ga	The Philip Carey Mfg. Company	666 Greenwood Avenue, N. E.
Baltimore, Md	The Philip Carey Mfg. Company	1400 Moreland Avenue
Baltimore, Md	The McCormick Asbestos Co	1400 Block Moreland Avenue
Birmingham, Ala	The Young & Vann Supply Company	1725-31 First Avenue
Boston, Mass	The Philip Carey Mfg. Company	267 Medford Street, Charlestown District
Bridgeport, Conn	Asbestos Distributors, Inc.	57-59 Knowlton Avenue
Buffalo, N. Y	The Philip Carey Mfg. Company	155 Erie Street (Mad. 2414)
Canton, Ohio	The Philip Carey Mfg. Company	1704 Eleventh Street, S. W.
Charlotte, N. C	The Philip Carey Mfg. Company	1429 Bryant Street
Chattanooga, Tenn	James Supply Company	515 E. 11th Street
Chicago, Ill.	The Philip Carey Mfg. Company	Roosevelt Road & Talman Ave.
Cincinnati, Ohio	The Philip Carey Mfg. Company	408 Commercial Square
Cincinnati, Ohio	R. E. Kramig & Co	222-224 E. 14th Street
Cleveland, Ohio	The Philip Carey Mfg. Company	5906-5916 Euclid Avenue
Columbus, Ohio	Earl E. Bright	34 East Swan Street
Columbus, Ohio	The Philip Carey Mfg. Company	464 No. Park Street
Dallas, Tex	The Philip Carey Mfg. Company	2220 So. Harwood Street
Dayton, Ohio	The Philip Carey Mfg. Company	Weakley Street at B. & O. R. R.
Detroit, Mich	The Philip Carey Mfg. Company	6197 Hamilton Avenue
Duluth, Minn.	A. W. Kuettel Company	308 Lake Ave., South
El Paso, Tex	Momsen-Dunnegan-Ryan Co	Overland, bet. Ochoa & Virginia Streets
Erie, Pa	The Philip Carey Mfg. Company	P. O. Box 215
Ft. Wayne, Ind.	Asbestos Ins. & Rfg. Co	1900-1902 So. Harrison St.
Ft. Worth, Tex.	E. O. Wood & Company	1704 Jones St.
Houston, Tex	Warren W. Bates	2329 Commerce Avenue
Huntington, W. Va	Banks-Miller Supply Co	742 Third Avenue
Indianapolis, Ind	The Philip Carey Mfg. Company	1111 East 19th Street
Jackson, Mich.	Jackson Insulation Co	902 E. Michigan Avenue
Jacksonville, Fla	The Cameron & Barkley Co	605 E. Forsyth Street
Kansas City, Mo	The Philip Carey Mfg. Company	2028-2030 Grand Avenue
Kansas City, Mo	Kelley Asbestos Products Co	2030 Grand Avenue
Knoxville, Tenn	The Philip Carey Mfg. Company	P. O. Box 1927
Knoxville, Tenn	A. G. Heins Company	116-126 Heins Street
Lansing, Mich.	Engineering Service Co	408 Wilson Bldg.
Little Rock, Ark.	Fischer Cement & Rfg. Co	1115 East Second St.
Los Angeles, Cal	The Philip Carey Mfg. Company	350 So. Anderson Street
Los Angeles, Cal	Warren & Bailey Co.	350 So. Anderson Street
Louisville, Ky	The Philip Carey Mfg. Company	1032-1044 So. Eighth Street
Memphis, Tenn	Fischer Lime & Cement Co.	263-295 Walnut Street
Miami, Fla	The Cameron & Barkley Co	727 N.W. 1st Ave. (P.O. Box 4278, Sta. A.)
Minneapolis, Minn	The Philip Carey Mfg. Company	1000 Washington Avenue, South
Montreal, Que., Can	Canadian Asbestos Co	316-322 Youville Square
Nashville, Tenn	T. L. Herbert & Sons	174 Third Avenue North
New Orleans, La.	J. J. Clarke Company, Ltd	Julia & Magnolia Sts. (P. O. Box 900)
New York, N. Y	The Philip Carey Mfg. Company	Lincoln Building, 60 E. 42nd Street
New York, N. Y	Armor Products, Inc., (Export)	21 West Street
New York, N. Y	Robert A. Keasbey Co. (Insulation Div.)	141 W. 19th Street
Norristown, Pa.	Asbestos Insulating Co	315 West Main St.
Philadelphia, Pa	The Philip Carey Mfg. Company	24th and Sedgley Avenue
Phoenix, Ariz	A. N. Borgquist	613 W. Roma Avenue
Pittsburgh, Pa	The Philip Carey Mfg. Company	Corliss Station
Port Chester, N. Y	Asbestos Distributors, Inc.	148-150 Pearl Street
Portland, Ore	Pacific Asbestos & Supply Company	Front and Clay Streets
Richmond, Va	The Philip Carey Mfg. Company	1805 High Point Avenue
Richmond, Va.	Virginia Insulation Co., Inc.	112 South Adams St.
Rochester, N. Y.	Elmer W. Davis, Inc	201 Mt. Hope Ave.
St. Louis, Mo	The Philip Carey Mfg. Company	4165 Duncan Avenue
San Francisco, Calif	Van Arsdale-Harris Co	Fifth and Brannan Streets
Seattle, Wash	The Philip Carey Mfg. Company	820 Fairview Place
Seattle, Wash	Pioneer Sand & Gravel Co., Inc.	901 Fairview Avenue, North
Shreveport, La.	R. F. Zimmerman & Co	3014 Sanford
Spokane, Wash	Nott-Atwater Company	South 157 Monroe Street
Tacoma, Wash.	Geo. Scofield Company	1543 Dock Street
Tampa, Fla	The Cameron & Barkley Co	South Franklin St. (P. O. Box 990)
Toledo, Ohio	The Geo. L. Freeman Co	1026 Water Street
Toronto 9, Ont., Can	Robt. T. Purves & Company	96-98 Vine Avenue, West Toronto
Tulsa, Okla	Kelley Asbestos Products Company	402 No. Boston Avenue
Washington, D. C	Asbestos Covering & Roofing Company	4104 Georgia Avenue, N. W.
Wheeling, W. Va	The Philip Carey Mfg. Company	Chapline at 18th Street
Youngstown, Ohio	The Philip Carey Mfg. Company	586 Mahoning Avenue

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GENERAL OFFICES
LOCKLAND, CINCINNATI, OHIO

FACTORIES: LOCKLAND, OHIO—PLYMOUTH MEETING, PA.
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